RAVO

USER MANUAL

These user instructions are a translation of the original user instructions:

RAVO bv

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NOTES

Ensure that this manual is always accessible in the cabin whilst the vehicle is in use. This is important to ensure the correct operation of the machine. Familiarise yourself with the information in this manual before operating the machine.

In view of the continuous product development, RAVO BV retains the right to make amendments to the user manual without giving prior notice. Please contact RAVO BV for up-to-date information.

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RAVO 5-Series MkV * H

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A. TECHNICAL SPECIFICATIONS

A. 1 Machine dimensions

Length	4525 mm
Width excl. mirrors	1805 mm
Width incl. mirrors	2280 mm
Sweeping width	2200 mm/2000 option
Height	2460 mm ST / 2460 mm CD / 2630 STH

A. 2 Machine weight

Empty weight on front axle	3080 kg ST / 3100 kg STH / 2980 kg CD
Empty weight on rear axle	2900 kg ST / 2930 kg STH / 3260 kg CD
Total empty weight	5980 kg ST / 6030 kg STH / 6240kg CD
Max. weight on front axle	see CE mark
Max. weight on rear axle	see CE mark
Max. weight	see CE mark
Load capacity	5130 kg ST / 5130 kg STH / 4870 kg CD

A. 3 Container

Tipping method	Tipping/58° ST/STH / Lifting/ejection CD
Operation	Hydraulic
Capacity	3.5 m3 ST/3.3 m3 CD/4.3 m3 STH
Tipping height	850 mm ST/1550 mm CD
Safety	Support in container door and below the container

A. 4 TIER3 engine

Make	Iveco
Type	N45 ENTX 21.00 / F4HE9484A
Diesel injection system	Common Rail – Electronic diesel control
High-pressure fuel pump type	Bosch CP 3
Number of cylinders	4
Total stroke volume (cc)	4485
Diameter & stroke (mm)	104 x 132
Compression ratio	16.5 : 1
PTO transmission ratio (PTO/engine)	1.03
Maximum torque (Nm)	560 @ 1400 rpm
Power (kW)	104 (141 hp) @ 2200 rpm
Specific fuel consumption (g/kWh)	205
Type of fuel	Standard diesel oil in accordance with EN 590
Engine-oil viscosity	15W40 Spec. MUIL-L-2104C/D (API CF-4/CF/CE)
Crankcase capacity (litre)	11.5 (incl. engine oil filter)
Coolant	Coolant to -40 °C
Coolant reservoir capacity (litres)	± 23
Supercharging	Turbo compressor with intercooler
Emission value/Standard value (g/kWh)	
CO	1.30 / 5.00
NOx + HC	3.79 / 4.00
Particulates	0.189 / 0.300
Engine emission level	Tier 3 / Stage IIIA, dir.2004/26/EC

A. 5 EURO5 engine

Make	Iveco
Type	N40ENT526.00 / F4AE3481D*S
Diesel injection system	Common Rail – Electronic diesel control
High-pressure fuel pump type	Bosch CP 3.3
Number of cylinders	4
Total stroke volume (cc)	3920
Diameter & stroke (mm)	102 x 120
Compression ratio	17 : 1
PTO transmission ratio (PTO/engine)	1.03
Maximum torque (Nm)	535 @ 1250 rpm
Power (kW)	118 (160 hp) @ 2700 rpm
Specific fuel consumption (g/kWh)	201
Type of fuel	Standard diesel oil in accordance with EN 590
Engine-oil viscosity	15W40 Spec. ACEA E3 - E5 and API CF - CH4
Crankcase capacity (litre)	10.5 (incl. engine oil filter)
Coolant	Coolant to -40 °C
Coolant reservoir capacity (litres)	± 23
Supercharging	Turbo compressor with intercooler
Emission value/Standard value (g/kWh)	
CO	0.55 / 1.5
HC	0.021 / 0.46
NOx	1.176 / 3.5
Particulates	0.018 / 0.02
Engine emission level	Euro 5, dir.2005/55/EC & 2006/51/EC by means of SCR and Urea (AdBlue) injection

A. 6 Fan

Drive	Hydraulic
Fan diameter	720 mm
Number of blades	10
Fan capacity	170 m3/min (10.200 m3/h)
Location	Container roof

A. 7 Sweeper unit

Operation	Hydraulic with joystick
Brush diameter	900 mm (750 mm optional)
Brush speed	0 - 165 rpm (adjustable)
Number of brushes	2 (third brush optional)
Suction head dimensions	120 x 630 mm
Suction duct diameter	225 mm

A. 8 Water system

Operation	Electric
Tank capacity TIER3	540 litres
Tank capacity EURO5	500 litres
Max. pump capacity	11.5 litres/min. at 2 bar
Pump	Mechanical water ring pump
Sprayer positions	Brushes, suction duct, suction head, (leaf suction, third brush optional)

A. 9 Drive

Transmission	Hydrostatic continuously variable
Traction	Via hydraulic pump and two wheel motors with planetary hub reduction
Hub reduction oil	2.5 litres Texaco MULTIGEAR 80W-140
Differential	Hydraulic

A. 10 Front axle and suspension

Type	McPherson hydro pneumatic suspension
Height adjustment	Electronically via sensors

A. 11 Brake system

System	Disk brakes for rear drum brakes Hydraulically operated via ATF system
Brake shoe make	Front: Wabco/Rear: Ferrodo
Dynamics	Hydrostatic brakes via the transmission when accelerator is released
Parking brake	On the rear wheels. Parking brake is spring loaded and lifted hydraulically. The parking brake is active when the machine is switched off (after the system depressurises).

A. 12 Tyres

Front tyre make	Bridgestone, R168 215/75 R17.5 135/133 J
Rear tyre make	Bridgestone, 215/75 R17.5 126/124 M dual
Turning circle	3730 mm
Wheelbase	1816 mm
Tyre pressure	front: 8.5 bar/rear: 7.1 bar

A. 13 Electrical system

Voltage	24 V
Battery	2 x 12 V, 72 Ah in series, maintenance-free battery
Generator	28 V, 90 A
Radio	12 V (via converter)
Lights	24 V

A. 14 Hydraulic system

Driving pump capacity	105 l/min
Driving pump operating pressure	420 bar
Booster pump capacity	22 l/min
Booster pump operating pressure	50 bar
Fan pump capacity	75 l/min
Fan pump operating pressure	175 bar
Brush pump capacity	19 l/min
Brush pump operating pressure	175 bar
Control pump capacity	22 l/min
Control pump operating pressure	150 bar
Battery filler system pump capacity	6 l/min
Brush motor operating pressure	165 bar max.
Fan motor operating pressure	175 bar

* Pump output at 1000 rpm.

A. 15 Hydraulic system

Suction valve operating pressure	175 bar
Operating pressure of driving motors	420 bar
Operating pressure of suction head lift	175 bar
Operating pressure of container cylinder	175 bar
Operating pressure of brush lift	175 bar
Operating pressure of brush swivel	175 bar
Operating pressure of container door cylinder	175 bar
Operating pressure of battery filler system	175 bar
Brake system operating pressure	140 bar
Manual container tilt	Hand pump
Hydraulic fluid tank location	Incorporated in frame
ATF fluid tank location	Engine compartment
Hydraulic fluid type	Texaco Rando HD-Z-46/DIN 51524: HLP/2&HVLP/3, ISO: VG46 &6743/4 HV
ATF fluid type	Texaco Texamatic 7045E/Dexron III
Hydraulic fluid tank capacity	95 litres
ATF fluid tank capacity	12 litres

* Pump output at 1000 rpm.

A. 16 Air conditioning (optional)

Cooling installation type	Interior cooling
Coolant type	R134a
Coolant capacity	1000 g

A. 17 Lights

Front indicator lights	LED
Rear indicator lights	LED
Indicator light on the side of the cabin.	LED
Rear light	LED
Dipped beam/Main beam	H7-24V/70W
Side lights	LED
Brake light	LED
Reverse light	24V-21W, bayonet
Flashing light	LED
Brush light	H3-24V/70W
Fog light	24V-21W, bayonet

A. 18 High pressure water pump (Optional)

Oil	SAE 20-30

A. 19 Lubricating grease

Grease	NLGI Grade 2

A. 20 Noise

Interior continuous sound pressure in accordance with 2000/14/EG Lpa	See sticker in cab, to the right next to the steering column
Guaranteed sound power level in accordance with 2000/14/EG Lwa	See sticker on outside of cab

A. 21 AdBlue

AdBlue	DIN 70070
Capacity of AdBlue tank	26 litres
Recommended	Total Diaxol, Air1 Optispray

A. 22 Vibrations

The measured vibrations are determined during typical use of the sweeper and by using the standards valid for this purpose. The measured values can vary during actual use depending on what the sweeper is being used for and the sweeping conditions.

Hands and arm values	≤ 2,5 m/s²
Full body (driver's seat)	≤ 0,5 m/s²

B. SAFETY

B. 1 Recognizing safety information

This is the safety warning symbol. When you see this symbol in the instruction manual, it is to be considered as a warning against possible bodily injury. Read the recommended instructions and follow the precautionary measures and the safe working practices.

B. 2 Explanation of the signal words

DANGER!
THE LIFE OF THE USER OR THAT OF OTHER PEOPLE IS DIRECTLY ENDANGERED.

WARNING!
THE OPERATOR OR PERSONS MAY THEMSELVES BE (SERIOUSLY) INJURED OR SERIOUSLY DAMAGE THE PRODUCT. WARNING! INDICATES DAMAGE TO THE USER/PERSONS OR THE PRODUCT, IF THE USER DOES NOT FOLLOW THE PROCEDURES CAREFULLY.

CAUTION!
THE PRODUCT MAY BE DAMAGED. CAUTION! INDICATES DAMAGE TO THE PRODUCT IF THE USER DOES NOT FOLLOW THE PROCEDURES CAREFULLY.

NOTE!
NOTE! PROVIDES IMPORTANT INFORMATION ABOUT INSTALLATION, OPERATION OR MAINTENANCE, WHICH IS IMPORTANT BUT DOES NOT INVOLVE DANGER.

B. 3 General safety instructions

Carefully read all the safety instructions in this instruction manual.

B. 3.1 Use the machine specification

The RAVO sweeper has been exclusively designed for sweeping operations on paved/metalled surfaces. Applications and/or use outside of this specification can affect function/safety.

B. 3.2 Use outside the machine specification

Hazardous situations can occur if the machine is used for purposes other than those for which the RAVO sweeper is intended. The dangers arising out of such use are the responsibility of the owner/operator or user. The manufacturer cannot be held liable for this.

B. 3.3 User/operator

Make sure the operator/user receives sufficient training/instruction in the use/operation of the sweeper. Do not allow other people to operate the sweeper without training/instruction. Provide effective instruction on how to correctly operate/use the machine. The operator/user must be notified of the valid traffic regulations and legislation. Persons under the influence of alcohol, medicines or drugs are not permitted to work with and/or carry out service or repairs on the sweeper.

The user/operator must ensure that while using the sweeper there are no objects or persons in the vicinity of the sweeper, particularly when reversing. Avoid damage or physical injury. The user/operator is responsible at all times for the safety and well-being of persons in close proximity to the sweeper.

B. 3.4 Maintenance

Keep your sweeper in good working order. Modifications to the sweeper that have not been approved may affect the correct operation and/or safety, warranty and service life of the sweeper. Maintenance and repair work requires specific knowledge and should therefore be carried out by specialists trained for this purpose.

If you require additional information to understand any part of this instruction manual, then please contact your RAVO dealer.

B. 3.5 Wear suitable clothing and safety equipment

Wear appropriate, close-fitting clothing and personal protective equipment when operating the machine. Be careful with anything that may become caught in the machine, such as jewellery or long hair. The safe operation of the equipment requires the operator's full attention. Do not wear headphones to listen to the radio or music whilst operating the machine. Be careful when using a mobile telephone whilst operating the equipment. For work being carried out outside of the driver's cab, protective measures should be taken, always wear suitable, visible safety clothing, and protection against dust and noise.

B. 3.6 Be careful with fuel and take measures to prevent a fire

Be careful with fuel. It is extremely flammable. Do not smoke or work in the vicinity of naked flames or sparks whilst refuelling the machine. Always switch off the engine before refuelling the machine. Fill the fuel tanks outside in the open air. Prevent fire by keeping the machine free of dirt, grease and debris. Always clean up any spilled fuel.

B. 3.7 Avoid contact with moving parts

Do not start the machine or the brushes whilst people are standing nearby. Due to their function, many moving parts, such as the side brushes, cannot be completely shielded. Keep away from these moving parts whilst the machine is in operation. Keep hands, feet and clothing away from the machine's driven parts.

B. 3.8 Avoid contact with hot surfaces

Certain parts inside the engine compartment and the exhaust system of the sweeper can get very hot. Avoid contact with the hot surfaces of these parts in the sweeper. First allow the sweeper to cool down sufficiently before starting to carry out work on these parts of the sweeper. Avoid physical injury.

B. 3.9 Prevent battery explosions

Battery gas can explode. Keep sparks and flames away from batteries. Never check the charge of a battery by placing a metal object across the terminals. Use a voltmeter. The battery's earth cable must always be removed first and re-connected last. Do not charge a frozen battery, otherwise it may explode. Always warm the battery to 16° C (60° F).

B. 3.10 Avoid contact with high-pressure liquids

Liquids escaping under high pressure can penetrate the skin and cause serious injury. Avoid this danger by reducing the pressure before disconnecting hydraulic lines or other lines. Tighten all connections before pressurizing the system. Check for leaks by using a piece of cardboard. Protect your hands and body from high-pressure liquids. If an accident has occurred, immediately call for medical assistance.

Keep hands and other body parts away from openings and nozzles that spray liquids under high pressure.

B. 3.11 Use the correct equipment and service components

Use tools that are suitable for the task in hand. Inappropriate tools and unsuitable procedures can result in hazardous situations. Only use electrical tools to tighten and loosen threaded parts. Use tools of the correct size to tighten and loosen parts. Avoid bodily injury that may result from slipping spanners. Only use service components, which meet the specifications of RAVO bv. These have been tested and approved by RAVO bv. The use of non-original and approved service components can have a negative impact on the safety and integrity of the sweeper. The use of unapproved service components falls outside the liability and does not affect the warranty of the machine.

B. 3.12 Comply with environmental regulations

Pay attention to the environment and the ecosystem. Before draining any liquid, decide on the best method of disposal. Observe the relevant environmental regulations when cleaning up oil, fuel, coolant, brake fluid, filters and batteries.

B. 3.13 Carry out maintenance work safely.

Keep the area clean and dry. Remove any accumulated grease, oil or dirt. Never carry out maintenance work or lubricate the machine whilst it is moving. Never crawl under a rotating sweeper. Provide adequate, safe security when carrying out maintenance work on top of the container. Make sure that all parts are in good condition and that they are properly installed. Repair damage immediately. Replace worn or broken parts.

B. 3.14 Take a break in good time

Working with the sweeper is labour-intensive, so take adequate rest breaks in good time. Comply with the local regulations and legislation in force relating to the taking of breaks and operating/driving a vehicle.

B. 3.15 Exhaust gasses

Never allow the engine to operate in an enclosed space. The exhaust gases contain the poisonous carbon monoxide. Inhaling exhaust gases is dangerous to health and can result in loss of consciousness or death.

B. 4 Scrapping the sweeper

If the sweeper is being scrapped, the regulations governing waste processing should be observed, which apply in the location and at the time of scrapping.

When scrapping the sweeper, the following activities must be carried out by a certified and specialist company.

WARNING!
A NUMBER OF SYSTEMS ARE PRESSURISED BY MEANS OF ACCUMULATORS. FIRST DEPRESSURISE THESE SYSTEMS BY DEPRESSURISING THESE ACCUMULATORS.

WARNING!
PAY ATTENTION THE ENVIRONMENT AND THE ECOSYSTEM. BEFORE DRAINING ANY LIQUID, DECIDE ON THE BEST METHOD OF DISPOSAL. ALWAYS COMPLY WITH THE RELEVANT ENVIRONMENTAL-PROTECTION MEASURES WHEN CLEARING UP OIL, FUEL, COOLANT, BRAKE FLUID, FILTERS AND BATTERIES.

B. 4.1 Activities to be completed

- Remove the batteries
- Depressurise the suspension system by discharging the oil pressure into a hydraulic tank
- Depressurise the accumulators for the suspension system and remove the accumulators
- Depressurise the accumulators for the braking system and remove the accumulators
- Remove all fuel from the fuel tank and the system
- Remove all hydraulic oil from the hydraulic tank and the system
- Remove the ATF oil from the ATF system
- Remove all engine oil from the engine block
- Remove all coolant from the engine and the cooling system
- Remove all the water from the water tanks.

1

2

B. 5 Sweeper emergency stop

The RAVO sweeper is fitted with an emergency stop. This emergency stop should only be used in emergency situations in which case all sweeper functions need to be stopped. After operating this emergency stop, it is only possible to continue to drive the sweeper, all other functions are then put out of operation.

⚠
NOTE!
THE EMERGENCY STOP IS ONLY ACTIVATED WHEN THE EMPTY / DRIVE / SWEEP SWITCH (2) IS IN THE SWEEP OR EMPTY POSITION. THE EMERGENCY STOP IS NOT ACTIVATED IN THE DRIVE POSITION.

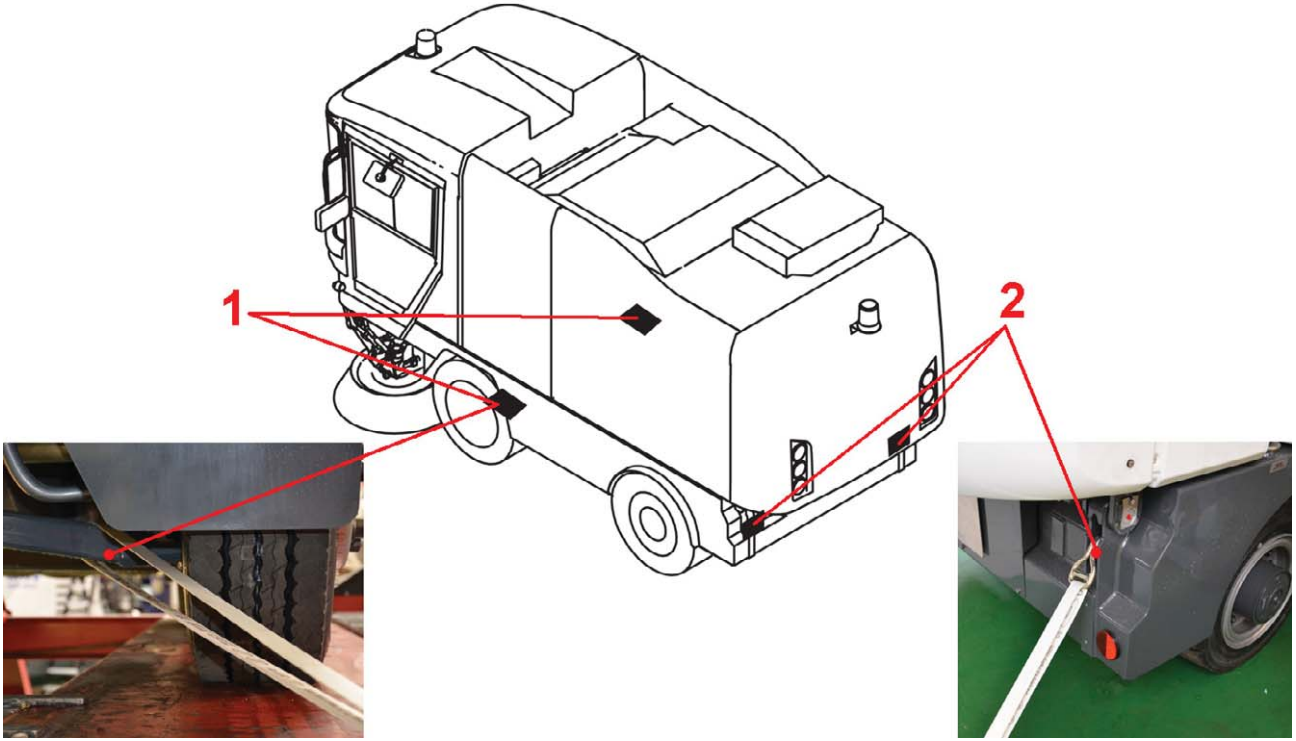
⚠
WARNING!
AFTER USING THE EMERGENCY STOP, ALWAYS RESOLVE THE HAZARDOUS SITUATION FIRST BEFORE RESETTING THE EMERGENCY STOP.

B. 5.1 Operating the emergency stop

- Depress the emergency stop (1). All sweeping and operating functions of the sweeper are put out of operation.

B. 5.2 Reset the emergency stop

- Turn the emergency stop (1) clockwise. The emergency stop will now be reset
- Set the Empty/Drive/Sweep switch (2) on the dashboard to Drive. All sweeper functions can now be operated again.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B. 6 Transporting the sweeper

Secure the sweeper to the transport vehicle to the anchor points on the machine using chains or straps with sufficient load capacity.

⚠

WARNING!!

SAFELY MANOEUVRE THE SWEEPER ON THE MEANS OF TRANSPORTT AND ALWAYS ENSURE THAT THE TOOLS USED ARE SUITABLE FOR THE WEIGHT OF THE MACHINE. REFER TO THE SPECIFICATIONS OF THE SWEEPER.

⚠

WARNING!

DO NOT MOVE THE SWEEPER WITH A HOIST AS THE SWEEPER IS NOT FITTED WITH LIFTING EYES.

B. 6.1 Securing

- Secure the sweeper at the front at the positions indicated (1).
- Secure the sweeper at the rear at the positions indicated (2).

C. PRODUCT DESCRIPTION

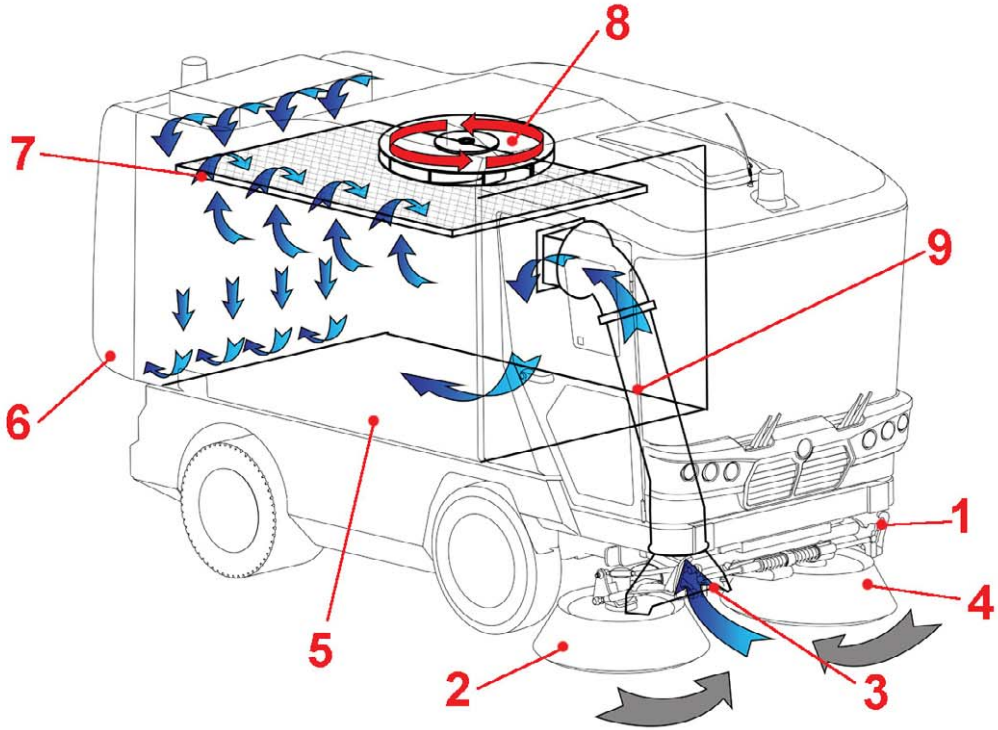
RAVO 5-Series

C. 1 Vehicle description

The RAVO sweeper combines compact external measurements with a high sweeping and suction capacity.

The following features make the RAVO very user friendly:

- Easily accessible and user-friendly instruments and operating levers
- A cabin that is well insulated against noise and extreme temperatures
- Good heating and ventilation options
- Good suspension in the driver's seat
- Spacious cabin
- Good visibility in all directions and a good view of the right-hand brush
- Good accessibility of the various vehicle components
- A very small turning circle and a short wheelbase
- A patented, maintenance-free brush system
- Powerful IVECO engine that meets current emission standards
- High compacting power for the waste in the container and a high load capacity
- A stainless steel container
- Low maintenance costs
- High resale value
- Long service life
- Automatic ride-height control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C. 2 Vehicle operation

The suction nozzle (3) (adjustable in height) sucks in the waste that has been collected by the brushes (2 and 4).The suction fan (8) in the hopper (5) ensures that there is a lower pressure in the hopper,which causes a flow of air. This flow of air then sucks the waste into the hopper (5) via the suction nozzle (3) and the suction tube (9).

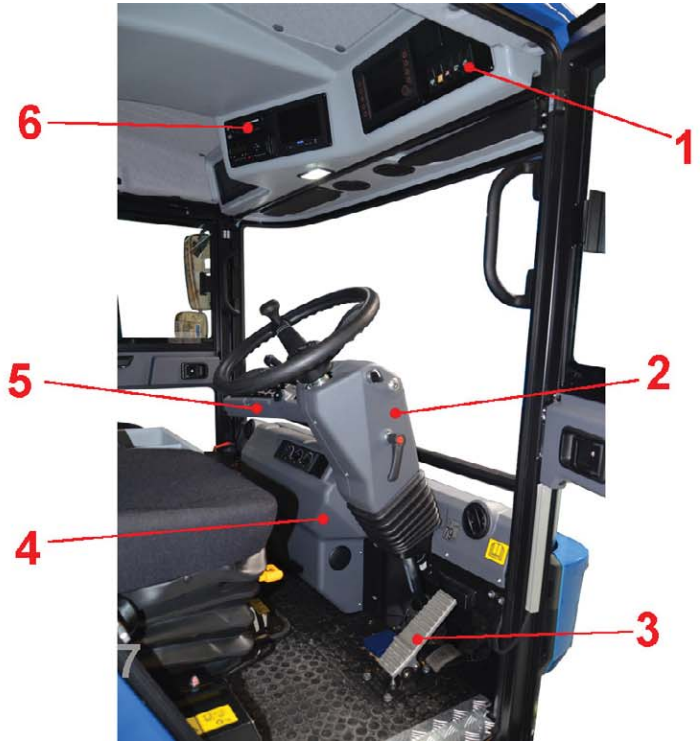
Water spray nozzles are located in the suction nozzle (3).These water spray nozzles have an important function.The water binds the waste and, as a result, the waste remains in the hopper (5) better.Very fine waste without water as a binding agent may be blown out of the machine again.Moreover, the water serves as a lubricant which helps reduce wear and contamination.

Water spray nozzles are also located at the brushes (2 and 4). These water spray nozzles are important to stop clouds of dust being formed when sweeping in dry conditions.It is, therefore, not necessary to use these sprays during damp weather conditions.

As a result of the construction that has been chosen for the hopper and the suction system, the waste will collect at the back of the hopper (5).In this way, the maximum capacity of the hopper is used.

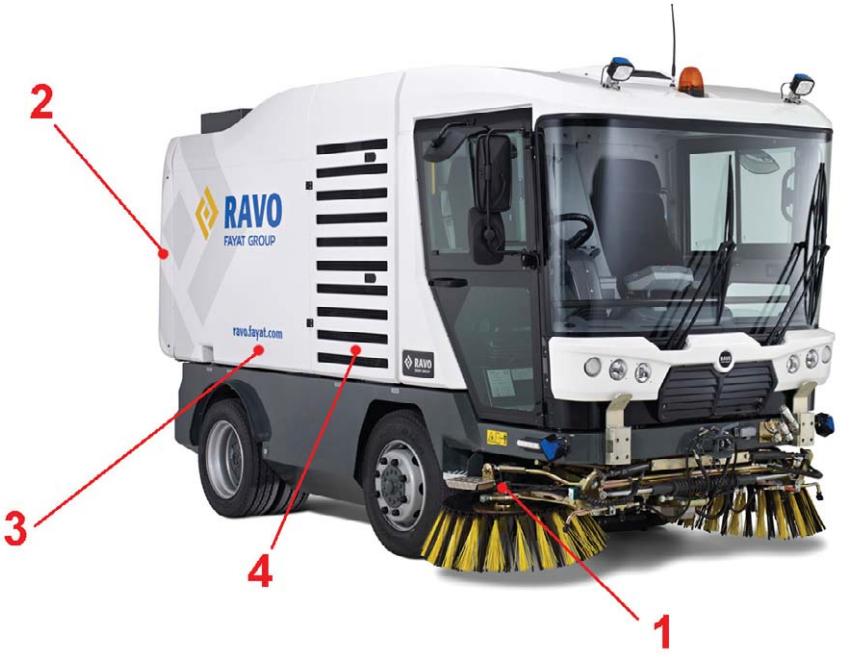
The grilles (7) and the suction fan (8) that provides the suction force are located at the top of the hopper.The excess air is expelled by the suction fan (8) at the rear (6) of the hopper (5).

C. 3 Location of the components



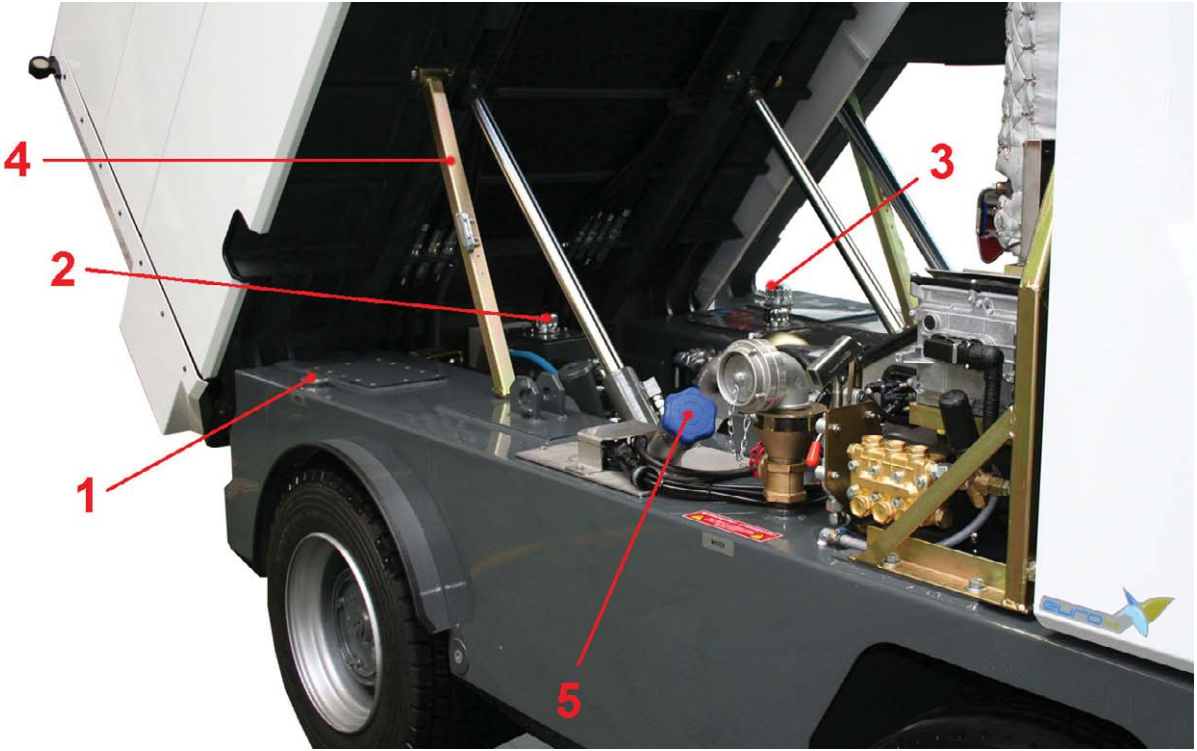
1: iSystem LED Display Panel
2:Steering column
3:Pedals
4:Heater
5:Dashboard
6:Radio

C. 4 Location of the components



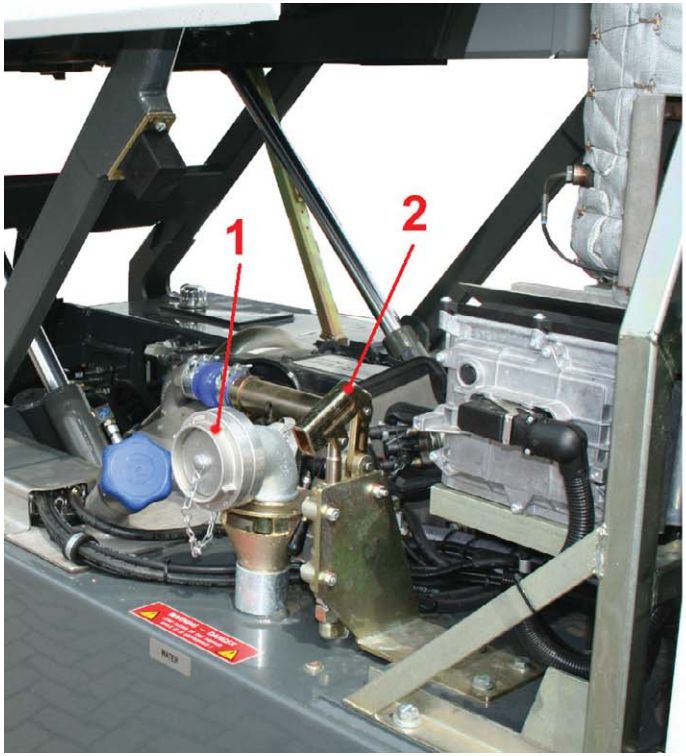
1:Brush system
2:Container door
3:Service door
4:Container

C. 5 Location of the components



1:Fuel cap
2:Hydraulic oil filler cap
3:Left-hand safety bracket
4:AdBlue filler cap

C. 6 Location of the components

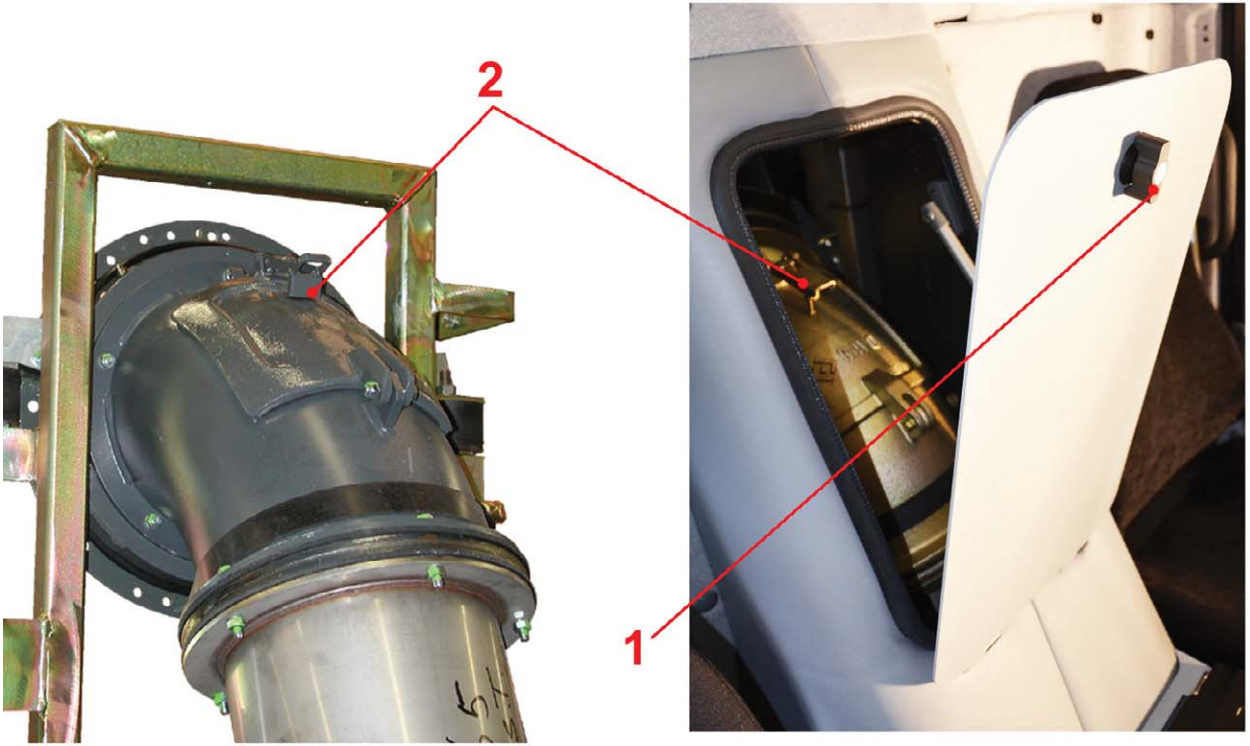


1:Water tank fill connection
2:Hand pump

WARNING
NEVER FILL THE WATER TANK WITH SALT WATER OR WATER TO WHICH CHEMICAL INGREDIENTS HAVE BEEN ADDED.THIS MAY CAUSE DAMAGE TO THE WATER SYSTEM.

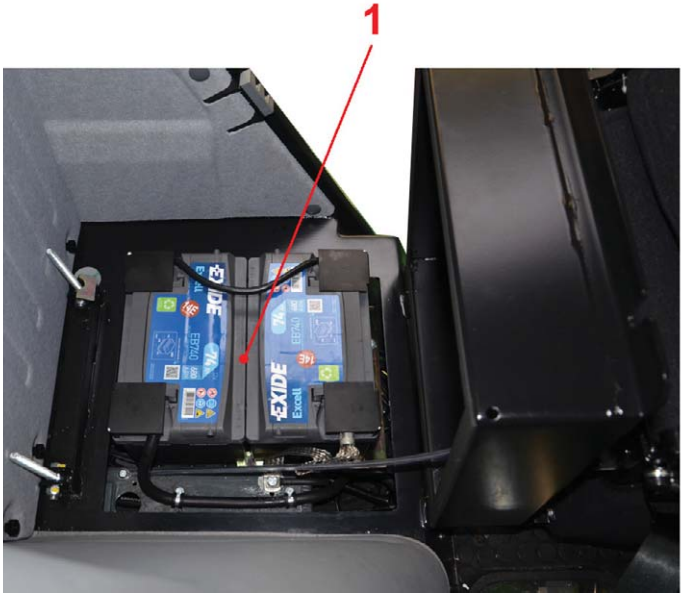
WARNING
ALWAYS ENSURE THAT CLEAN AND FRESH WATER IS USED DURING SWEEPING OPERATIONS.UNFRESH, BRACKISH WATER MAY CAUSE DAMAGE TO HEALTH.PREVENT BACTERIAL INFECTIONS BY REGULARLY RINSING THE WATER SYSTEM THROUGH WITH CLEAN WATER.

C. 7 Location of the components



1:Inspection hatch suction tube tunnel
2:Suction tube inspection hatch

C. 8 Location of the components



CAUTION:
DO NOT USE A BATTERY JUMP STARTER TO START THE SWEEPER'S ENGINE.THIS MAY DAMAGE THE SWEEPER'S ELECTRICAL SYSTEM.

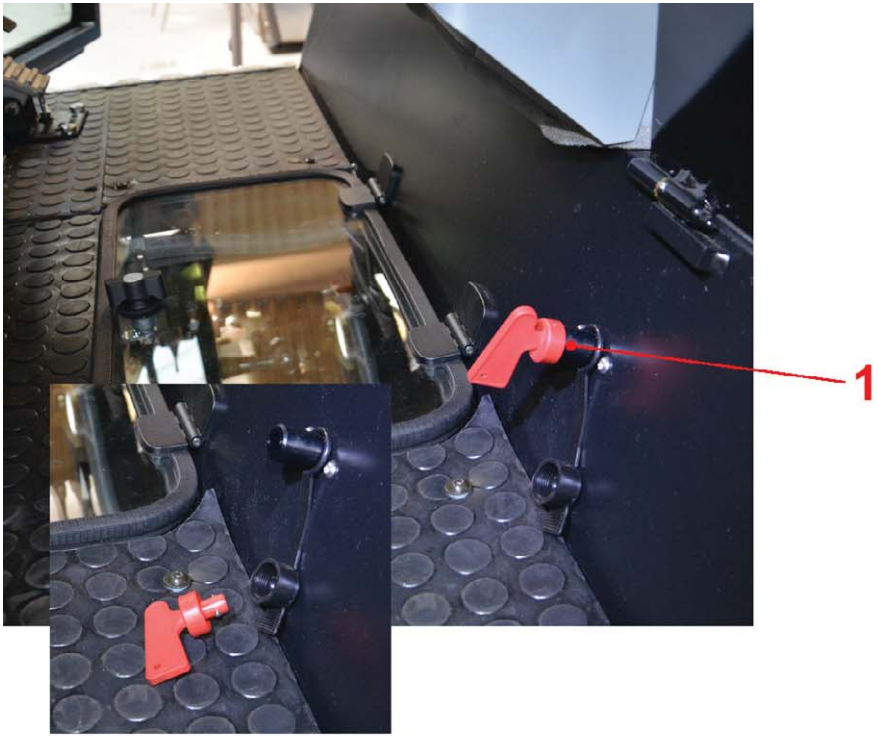
CAUTION:
ONLY USE MAINTENANCE-FREE BATTERIES.

1:Battery 2 x 12V

C. 9 Location of the components

1:High-pressure water pump (optional)

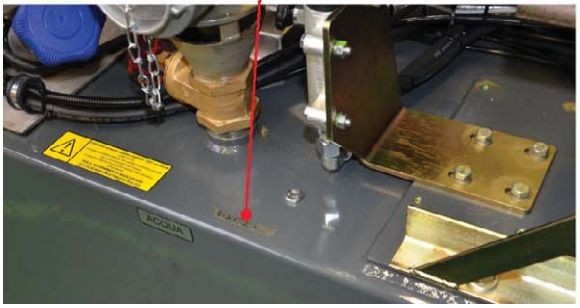
C. 10 Location of the components



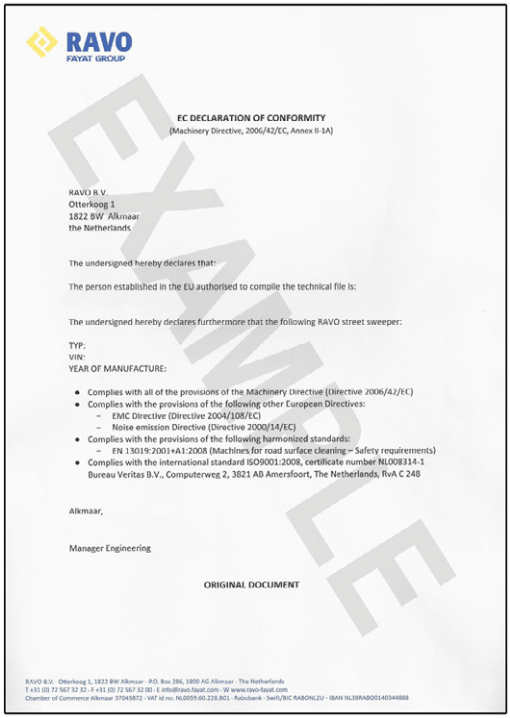
NOTE!
FOR EURO 5 SWEEPERS, IT IS VERY IMPORTANT TO WAIT AT LEAST THREE MINUTES AFTER THE SWEEPER'S ENGINE HAS BEEN STOPPED BEFORE TURNING OFF THE POSITIVE BATTERY TERMINAL SWITCH.THIS WILL ALLOW THE ADBLUE PUMP TO PUMP THE SYSTEM EMPTY.

1:Positive battery terminal switch

C. 11 Location of the components



1:Vehicle Identification Number (V.I.N.) plate
2:Vehicle Identification Number (V.I.N.)Chassis



RAVO
FAYAT GROUP

EC DECLARATION OF CONFORMITY
(Machinery Directive, 2006/42/EC, Annex II-1A)

RAVO B.V.
Otterkoog 1
1822 BW Alkmaar
the Netherlands

The undersigned hereby declares that:

The person established in the EU authorised to compile the technical file is:

The undersigned hereby declares furthermore that the following RAVO street sweeper:

TYP:
VIN:
YEAR OF MANUFACTURE:

- Complies with all of the provisions of the Machinery Directive (Directive 2006/42/EC)
- Complies with the provisions of the following other European Directives:
  - EMC Directive (Directive 2004/108/EC)
  - Noise emission Directive (Directive 2000/14/EC)
- Complies with the provisions of the following harmonized standards:
  - EN 13019:2001+A1:2008 (Machines for road surface cleaning – Safety requirements)
- Complies with the international standard ISO9001:2008, certificate number NL008314-1 Bureau Veritas B.V., Computerweg 2, 3821 AB Amersfoort, The Netherlands, RvA C 248

Alkmaar,

Manager Engineering

ORIGINAL DOCUMENT

EXAMPLE

RAVO B.V. - Otterkoog 1, 1822 BW Alkmaar - P.O. Box 286, 1800 AG Alkmaar - The Netherlands
T +31 (0) 72 567 32 32 - F +31 (0) 72 567 32 00 - E info@ravo.fayat.com - W www.ravo-fayat.com
Chamber of Commerce Alkmaar 37045872 - VAT Id nu. NL0059.60.228.B01 - Rabobank - Swift/BIC RABONL2U - IBAN NL38RABO0140344888

C. 12 CE declaration of conformity

All machines comply with the associated CE declaration of conformity and CE mark on the machine.

The machine meets the following conditions:

* Machinery Directive (Directive 2006/42/EC).

* EMC Directive (Directive 2004/108/EC).

* Noise emission (Directive 2000/14/EG)
  - Measured sound power level of this equipment LWA = XXX dB (A)
  - Guaranteed sound power level of this equipment LWA = XXX dB (A)

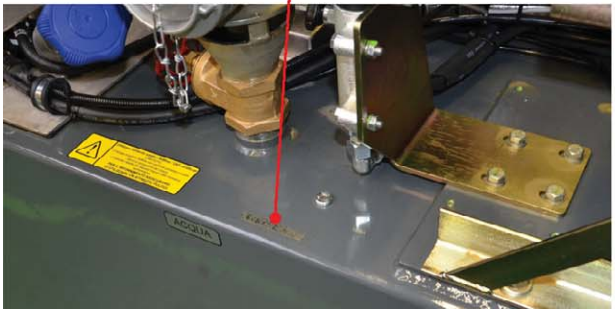
  * At the maximum recommended revolutions per minute of XXXX rpm whilst sweeping.

  - Complies with the evaluation procedure: Appendix V.

* The harmonised standards: EN 13019:2001 + A1: 2008 (Machines for road surface cleaning - Safety requirements).

* The international standard ISO9001: 2008, number of the certificate NL008314-1
  Bureau Veritas BV, Computerweg 2, 3821 AB Amersfoort, the Netherlands, RvA C 248.

RAVO B.V.
OTTERKOOG 1, ALKMAAR
THE NETHERLANDS
CE
STREET SWEEPER
TYP: RAVO 5-SERIES 540
VIN: XL95F
YEAR OF MANUFACTURE: 2015
ENGINE: IVECO F4HE9484A (TIER 3)
POWER: 104 kW at 2200 min-1
1 2 1+2
EMPTY 3000 2900 5900 kg
EMPTY 3000 2950 5950 kg
EMPTY 3060 3160 6220 kg
MAX 4850 7070 11400 kg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RAVO B.V.
OTTERKOOG 1, ALKMAAR
THE NETHERLANDS
CE

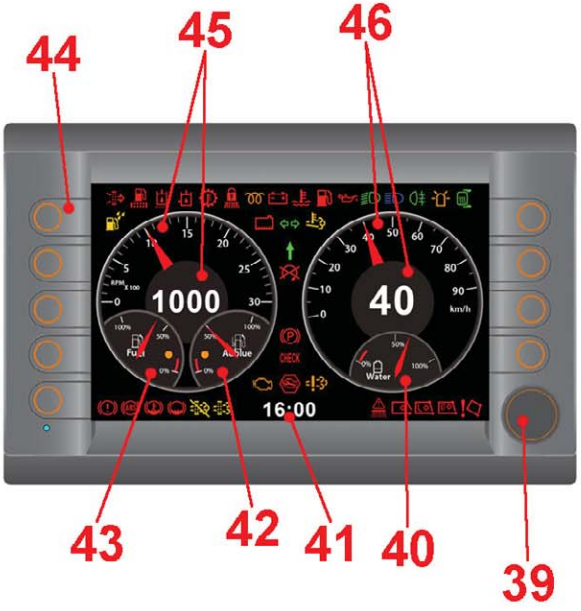
C. 13 Vehicle Identification Number (VIN)

All machines meet the Machinery Directive 2006/42/EC complete with the associated CE declaration of conformity and CE mark on the machine.You can find the mark on the right-hand side of the machine by the driver's seat.The Vehicle Identification Number (VIN) is stated on this CE mark.Set out in the table below you can find an explanation of the structure of the Vehicle Identification Number (VIN).

C. 13.1 Explanation of the Vehicle Identification Number (VIN)

X	L	9	5	F	5	C	6	A	9	0	0	2	0	0	0	1	< Example (VIN)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	< Position (VIN)
WMI			Vehicle description section						Vehicle indication section								Subject
			Type	Variant		Version											
X	X	X															World manufacturer identification number
			X														Type
				X													Chassis
					X												Engine type
						X											Container type
							X										Max. speed/Brake system
								X									USA control number
									X								Model year
										X							Serial number (part1)
											X	X	X				World manufacturer identification number (part2)
														X	X	X	Serial number (part2)

D. OPERATING CONTROLS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D. 1 iSystem LED screen ‘Drive’

The iSystem LED display shows information on the current status of the sweeper.Relevant information is displayed depending on the selected sweeper mode (Dump/ Drive/Sweep).This information can include warnings, status and/or level information, speed and engine information.When the ignition is switched on, all indications are shown for three seconds.This section describes the driving screen of the iSystem LED display.

D. 1.1 Air filter indicator light (option)

The air filter indicator light (1) goes on when the filter is restricted.

D. 1.2 Fuel filter indicator light

The fuel filter indicator light (2) goes on when the fuel filter is restricted.

⚠

WARNING

STOP THE SWEEPER IMMEDIATELY IN A SAFE LOCATION AND SWITCH OFF THE ENGINE.HAVE YOUR SERVICE DEPARTMENT DRAIN THE WATER FROM THE FUEL SYSTEM.

D. 1.3 Hydraulic oil filter indicator light (option)

The hydraulic oil filter indicator light (3) goes on when the hydraulic return filter is blocked.

D. 1.4 Hydraulic oil level indicator light

The hydraulic oil level indicator light (4) goes on if the oil level in the hydraulic tank is too low.The warning buzzer will also give a signal.

⚠

WARNING

IF THE INDICATOR LIGHT IS LIT AFTER YOU START THE ENGINE, OR DURING DRIVING AND/OR DURING NORMAL SWEEPING OPERATIONS, IMMEDIATELY STOP THE SWEEPER IN A SAFE LOCATION AND IMMEDIATELY SWITCH OFF THE ENGINE.VISUALLY CHECK THE HYDRAULIC OIL LEVEL ON THE LEVEL/TEMPERATURE GAUGE AND LOOK UNDER THE SWEEPER FOR ANY LEAKS.HAVE THE HYDRAULICS SYSTEM CHECKED BY YOUR SERVICE DEPARTMENT.

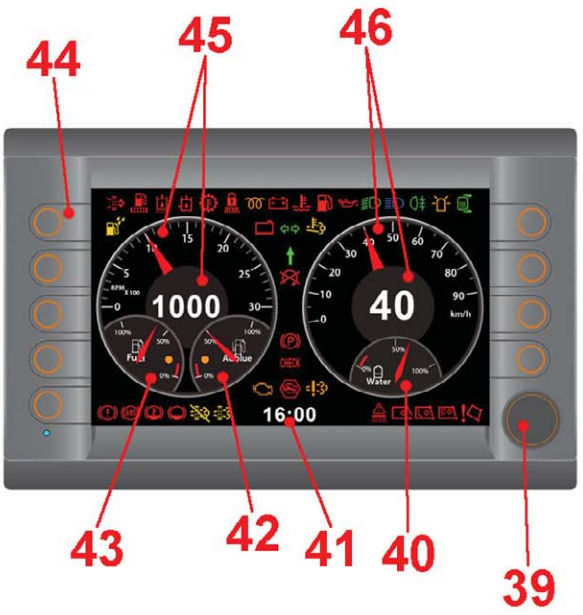
D. 1.5 Drive temperature indicator light

The drive temperature indicator light (5) goes on when the temperature of the drive system becomes too high.The warning buzzer will also give a signal.

⚠

WARNING

STOP THE SWEEPER IMMEDIATELY IN A SAFE LOCATION.CHECK THE COOLANT TEMPERATURE OF THE ENGINE AND CHECK THE OIL LEVEL OF THE HYDRAULICS TANK.HAVE THE DRIVE PUMP CHECKED BY YOUR SERVICE DEPARTMENT.



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7 17 CHECK 27 37
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9 19 29 38
10 20 30 38

D. 1.6 Sweeping limited

The sweeping limited indicator light (6) goes on when the emergency stop is operated, one of the cabin doors is open or there is an internal fault in the PLC.If the sweeping limited indicator light is on, the sweeping function will be limited or stopped.

D. 1.7 Engine start indicator light

The engine start indicator light (7) goes on when the ignition key is switched on; the engine must not be started yet.Once the engine start indicator light goes out, the engine may be started.

D. 1.8 Alternator indicator light

The alternator indicator light (8) goes on when the alternator is providing no power or too little to charge the battery.

Stop the sweeper immediately in a safe location and switch off the engine.Tilt the container manually and check the belts of the cooling fan and the alternator drive.

If the belts are broken, have them replaced.Do not continue to drive with broken belts!

If the belts are still intact, contact your service department.

⚠
NOTE
IF THE CHARGING VOLTAGE DROPS BELOW 24 VOLTS THERE IS A DEFECT IN THE CHARGING CIRCUIT.CONTACT YOUR SERVICE DEPARTMENT.

D. 1.9 Coolant indicator light

The coolant temperature indicator light (9) goes on when the temperature of the coolant becomes too hot.

D. 1.10 Fuel indicator light

The fuel indicator light (10) goes on when the fuel level in the fuel tank is less than 15%.

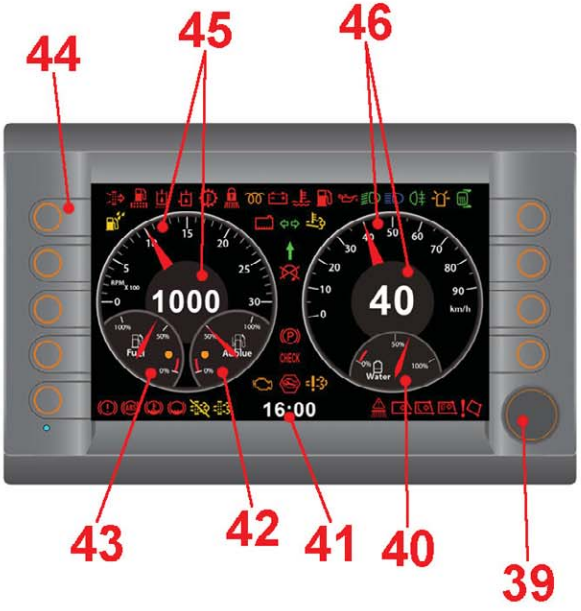
D. 1.11 Engine oil pressure indicator light

The engine oil pressure indicator light (11) goes on when the engine oil pressure is too low.

⚠
WARNING
STOP THE SWEEPER IMMEDIATELY IN A SAFE LOCATION AND SWITCH OFF THE ENGINE.HAVE THE LUBRICATION SYSTEM CHECKED BY YOUR SERVICE DEPARTMENT.

D. 1.12 Dipped beam indicator light

The dipped beam indicator light (12) goes on when the dipped beam switch is activated.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D. 1.13 Main beam indicator light
The main beam indicator light (13) goes on when the main beam switch is activated.

D. 1.14 Fog light indicator light
The fog light indicator light (14) goes on when the fog light switch is activated.

D. 1.15 Indicator beacon light
The beacon light indicator (15) goes on when the beacon light switch is activated.

D. 1.16 Heated mirror indicator light (option)
The heated mirror indicator light (16) goes on when the heated mirror switch is activated.

D. 1.17 Water in fuel
The water in fuel indicator light (17) indicates that there is water in the fuel filter.

D. 1.18 Brake fluid pressure indicator light
The brake fluid pressure indicator light (18) goes on when the brake fluid pressure is too low.The warning buzzer will also give a signal.

D. 1.19 ABS indicator light
The ABS indicator light (19) goes on when a fault occurs in the ABS system.

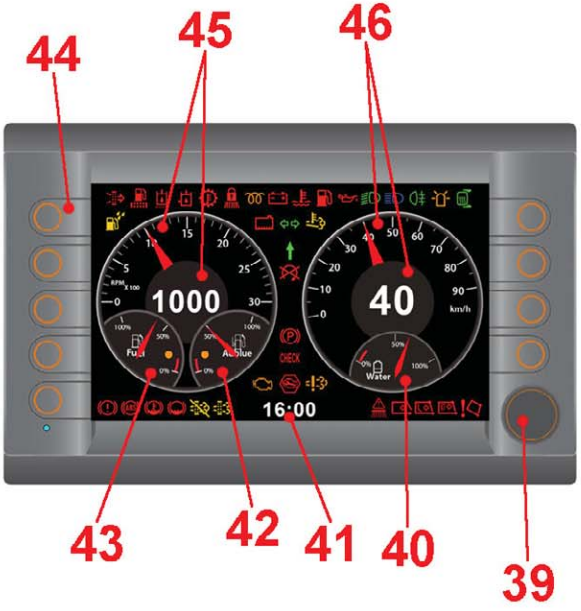
D. 1.20 Steering and brake fluid temperature indicator light (Option ABS)
The steering and brake fluid temperature indicator light (20) goes on when the fluid temperature in the tank is too high.The warning buzzer will also give a signal.

D. 1.21 Steering and brake fluid level indicator light
The steering and brake fluid level indicator light (21) goes on when the fluid level in the tank is too low.The warning buzzer will also give a signal.

⚠
WARNING
IF THE INDICATOR LIGHT IS LIT AFTER YOU START THE ENGINE, OR DURING DRIVING AND/OR DURING NORMAL SWEEPING OPERATIONS, IMMEDIATELY STOP THE SWEEPER IN A SAFE LOCATION AND IMMEDIATELY SWITCH OFF THE ENGINE.VISUALLY CHECK THE FLUID LEVEL ON THE LEVEL/TEMPERATURE GAUGE AND LOOK UNDER THE SWEEPER FOR ANY LEAKS.HAVE THE FLUID SYSTEM CHECKED BY YOUR SERVICE DEPARTMENT.

D. 1.22 Exhaust cleaning stop (Tier 4)
The exhaust cleaning stop indicator light (22) indicates that the filter regeneration has been blocked by the user.

D. 1.23 Exhaust cleaning (Tier 4)
The exhaust cleaning indicator lamp (23) indicates that the filter regeneration has been initiated by the user.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D. 1.24 Engine Data Controller (EDC) indicator light

The EDC indicator light (24) goes on when the Engine Data Controller (EDC) malfunctions or performs a check.The indicator light will flash slowly when the ignition switch is turned on.

D. 1.25 EDC indicator light

The EDC indicator light (25) goes on when there is a serious defect.Stop the vehicle immediately in a safe location and switch off the engine.

D. 1.26 OBD emission values indicator light

The emission values indicator light (26) goes on or flashes when a fault has occurred in the system or the level of AdBlue in the tank is too low.

WARNING

IF THE OBD INDICATOR LIGHT GOES ON OR FLASHES, STOP THE MACHINE IN A SAFE LOCATION AND TURN OFF THE ENGINE.CHECK THE ADBLUE LEVEL IN THE TANK.IF THE TANK IS FULL, HAVE THE SYSTEM CHECKED BY THE SERVICE DEPARTMENT.

WARNING

DRIVING WITH A LOW ADBLUE LEVEL WILL HARM THE ENVIRONMENT.THE SYSTEM WILL THEN NO LONGER MEET THE EURO5 STANDARD.THE ENGINE'S POWER WILL BE REDUCED BY THE SYSTEM.FAILURE TO COMPLY WITH THE EURO 5 STANDARD IS A VIOLATION OF THE LAW.

D. 1.27 On-board computer indicator light

The on-board computer indicator light (27) goes on if the on-board computer detects an internal fault.

D. 1.28 Parking brake indicator light (handbrake)

The parking brake indicator light (28) goes on when the parking brake is engaged.

D. 1.29 Engine stop indicator light

The engine stop indicator light (29) goes on if the engine stops of its own accord.The indicator light flashes when the engine is going to be stopped.

D. 1.30 MSC indicator light

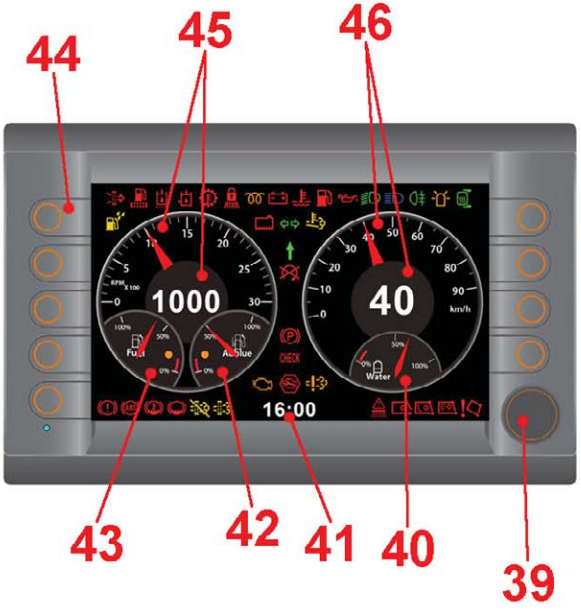
The Machine Safety Controller (MSC) indicator light (30) goes on when the (machine control) MSC signals a fault.

D. 1.31 Container rear door indicator light (only CD version)

The container rear door indicator light (31) goes on when the rear door of the container is not sealed properly.

D. 1.32 Container pusher indicator light (only CD version)

The container pusher indicator light (32) goes on when the pusher of the container dump is not stowed away properly.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D. 1.33 Container service doors indicator light (only CD version)
The container service doors indicator light (33) goes on when one of the container service doors is not properly closed.

D. 1.34 Container raised indicator light
The container raised indicator light (34) goes on when the container is tilted (ST version) or raised (CD version).

D. 1.35 Engine coolant level indicator light (only Tier 4)
The engine coolant level indicator light (35) goes on when the engine coolant level is too low.

D. 1.36 Direction indicators
When the direction indicator lever on the steering column is operated, the indicator light (36) for the direction indicators will flash.The warning buzzer will also give a pulsing signal

D. 1.37 Exhaust temperature indicator light (Euro 6 and Tier 4)
The exhaust temperature indicator light (37) goes on when the exhaust temperature is high.

D. 1.38 Direction indicator
The driving direction indicator (38) indicates the selected mode of the driving direction switch.The direction indicator shows three positions: forward/neutral/reverse.

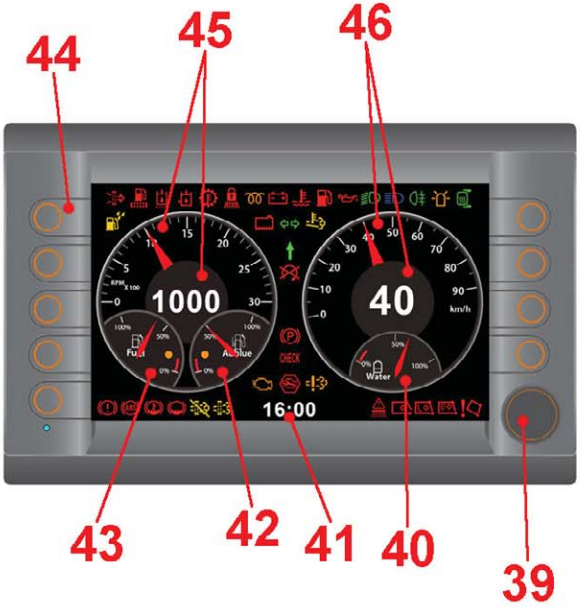
D. 1.39 Rotation/selection knob
The rotation/selection knob (39) of the iSystem LED screen is used to scroll or confirm selections by turning the knob.This is only possible if the screen mode allows it.

D. 1.40 Spraywater level gauge
The spraywater level gauge (40) shows the amount of water in the spraywater tank.

D. 1.41 Clock
The clock displays the current time.This can be set manually

D. 1.42 AdBlue level gauge
The AdBlue level gauge (42) shows the amount of AdBlue in the AdBlue tank.The gauge also includes an LED that goes on when the level in the AdBlue tank falls below 15%.Always make sure that the AdBlue tank is sufficiently filled.

⚠
WARNING
DRIVING WITH A LOW ADBLUE LEVEL WILL HARM THE ENVIRONMENT.THE SYSTEM WILL THEN NO LONGER MEET THE EURO5 STANDARD.THE ENGINE'S POWER WILL BE REDUCED BY THE SYSTEM.FAILURE TO COMPLY WITH THE EURO 5 STANDARD IS A VIOLATION OF THE LAW.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D. 1.43 Fuel level gauge

The fuel level gauge (43) indicates the quantity of fuel in the fuel tank.Always make sure that the fuel tank is sufficiently filled.The gauge also includes an LED that goes on when the level in the fuel tank falls below 15%.The indicator lamp (10) goes on.

D. 1.44 Selection knob

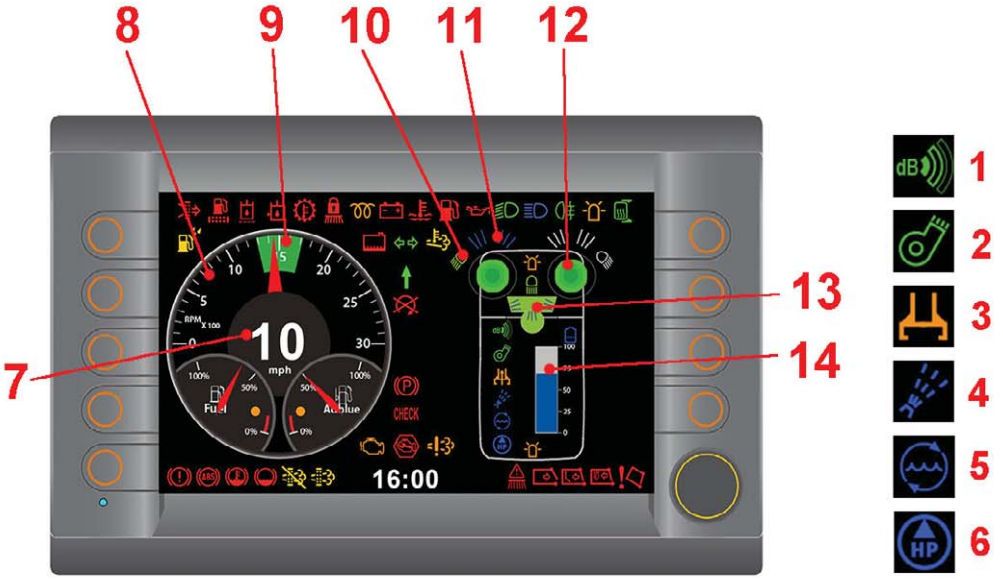
The selection knob (44) of the iSystem LED screen is used to confirm selections.This is only possible if the screen mode allows it.In total there are 9 buttons.Other screens can be activated with these buttons.

D. 1.45 Speedometer

The speedometer (45) shows the current driving speed of the sweeper.Digital and analogue.

D. 1.46 Rev. counter

The rev. counter (46) indicates the engine revs.Digital and analogue.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D. 2 iSystem LED display – sweeping

The iSystem LED display shows information on the current status of the sweeper.Relevant information is displayed depending on the selected sweeper mode (Dump/ Drive/Sweep).This information can include warnings, status and/or level information, speed and engine information.This section only describes the relevant information about the 'Sweep' LED screen.The items previously discussed in connection with the 'Drive' screen are not described here.

D. 2.1 Silent indicator light (option)

The silent indicator light (1) is lit when this option is activated.

D. 2.2 Fan indicator light

The fan indicator light (2) is lit when this fan is activated.

D. 2.3 Suction nozzle indicator light

The suction nozzle indicator light (3) is lit when the nozzle is activated.

D. 2.4 Spraywater pump indicator light

The spraywater pump indicator light (4) is lit when the spraywater pump is activated.

D. 2.5 Water recirculation indicator light (option)

The water recirculation indicator light (1) is lit when this option is activated.

D. 2.6 HP water pump (option)

The HP water pump indicator light (6) is lit when this option is activated.

D. 2.7 Speedometer

The speedometer (7) shows the current driving speed of the sweeper.Digital only.

D. 2.8 Rev. counter

The rev. counter (8) indicates the engine revs.Analogue only.

D. 2.9 Ideal sweep rev range

The tachometer is labelled with the rev range (9) for optimum sweeping.Under normal conditions.

D. 2.10 Lighting

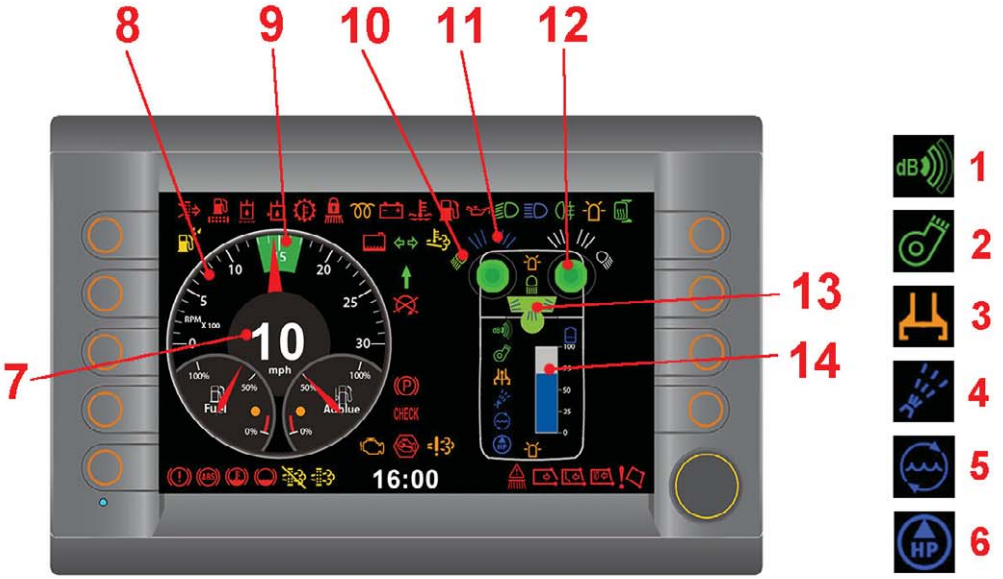
The lighting indicator (10) indicates whether the work lighting is on.Green = on.

D. 2.11 Brush washers

The brush sprayer indicator (11) indicates whether the brush sprayers are activated.Blue = on.

D. 2.12 Brush speed

The brush speed indicator (12) indicates the minimum and maximum brush speed.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D. 2.13 Suction nozzle and suction tube sprayers

The suction nozzle and suction tube sprayer indicator (13) indicates whether the sprayers in the suction nozzle and suction tube are activated.Blue = on.

D. 2.14 Water level gauge

The water level gauge (14) indicates the water level percentage of the water tanks.

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D. 3 iSystem LED display ‘Dump’

The iSystem LED display shows information on the current status of the sweeper.Relevant information is displayed depending on the selected sweeper mode (Dump/ Drive/Sweep).This information can include warnings, status and/or level information, speed and engine information.This section only describes the relevant information about the ‘Dump’ LED screen.The items previously discussed in connection with the ‘Drive’ and ‘Sweep’ screens are not described here.

D. 3.1 Dump status indicator

The Dump status indicator shows which position the container is in during Dumping.

D. 3.2 Rev. counter

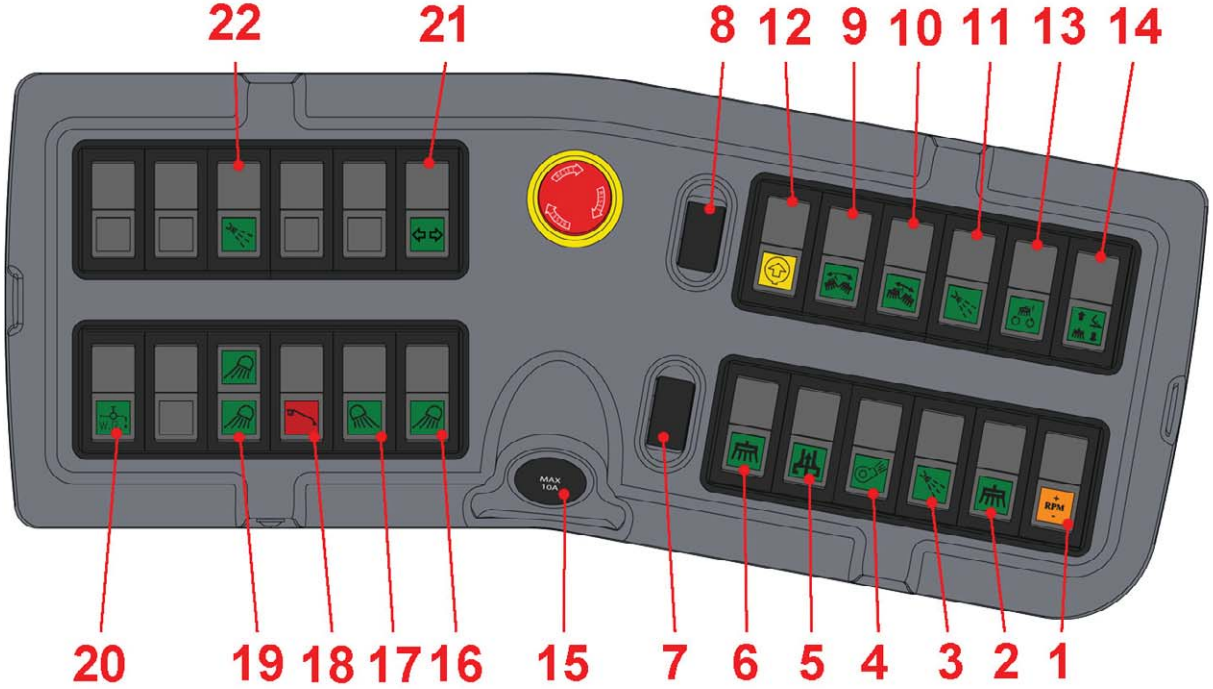
The rev. counter (2) indicates the engine revs.Analogue only.

D. 3.3 Speedometer

The speedometer (3) shows the current driving speed of the sweeper.Digital only.

D. 3.4 HP water pump (option)

The HP water pump indicator light (4) is lit when this option is activated.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D. 4 Dashboard

The dashboard is situated to the left of the steering wheel on top of the central console.On the dashboard you will find all the major switches for the brushing, suction and spray unit and the hand accelerator activation button.

NOTE

THE LAYOUT OF THE DASHBOARD CAN DIFFER DEPENDING ON THE MACHINE, TO ACCOMMODATE ANY SPECIAL OPTIONS ADDED.THE LAYOUT DESCRIBED HERE IS THE STANDARD LAYOUT WITH THE MOST COMMON OPTIONS.THE FUNCTIONALITY OF THE SWITCHES REMAINS THE SAME EVEN IF THEY ARE FITTED IN A DIFFERENT PLACE.

D. 4.1 Hand accelerator activation button

The operating speed of the engine can be set with the hand accelerator activation button (1) if the Dump/Drive/Sweep switch is in the Dump or Sweep position.

D. 4.2 Brush switch (with ‘independently lifting of right brush’ option)

The brush switch (2) has three positions:

D. 4.2.1 Position ‘0’/brush-drive off

The brush drive and spraywater provision are switched off.

D. 4.2.2 Position ‘1’/brush-drive on

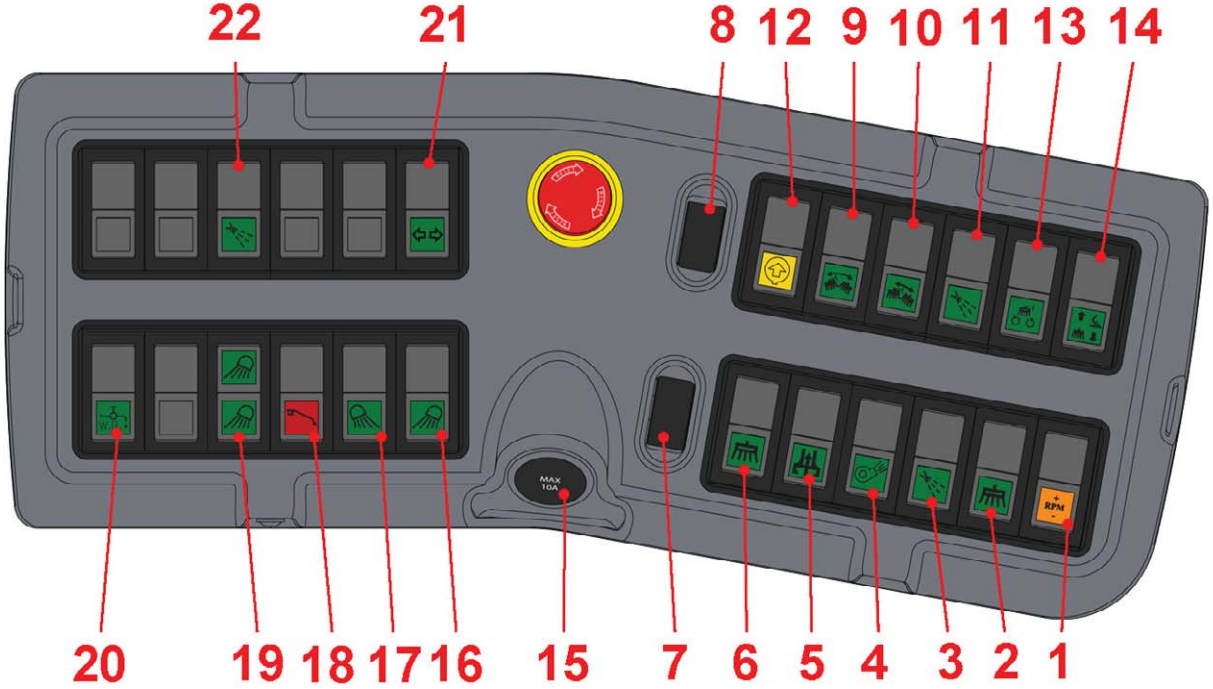
The engine must be running, the Dump/Drive/Sweep switch (14) must be set to Sweep and the joystick for the brushes must be moved to the ‘brush down’ position.

The brushes move down and start turning.

D. 4.2.3 Position ‘2’/brush drive on and spraywater on

Switch the spraywater pump switch (3) on

The spraywater provision on the brushes and/or in the suction nozzle will start to spray (depending on the position of the spraywater pump switch).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(with ‘independent lifting of right brush’ option)

D. 4.2.4 Position ‘0’/brush-drive off

The brush drive and spraywater provision are switched off.

D. 4.2.5 Position ‘1’/brush-drive on

The engine must be running, the Dump/Drive/Sweep switch (14) must be set to Sweep and the joystick for the brushes must be moved to the ‘brush down’ position

The right brush moves down and starts turning.

D. 4.2.6 Position ‘2’/brush drive on and spraywater on

Switch the spraywater pump switch (3) on

The spraywater provision on the right brush and/or in the suction nozzle will start to spray (depending on the position of the spraywater pump switch).

D. 4.3 Spraywater pump switch

The spraywater pump switch (3) has three positions:

D. 4.3.1 Position ‘0’/spraywater pump off

The spraywater pump is off

D. 4.3.2 Position ‘1’/spraywater pump on

The engine must be running and the Dump/Drive/Sweep (14) switch must be set to Sweep

The spraywater provision to the brushes is activated.

D. 4.3.3 Position ‘2’/sprayers in suction nozzle

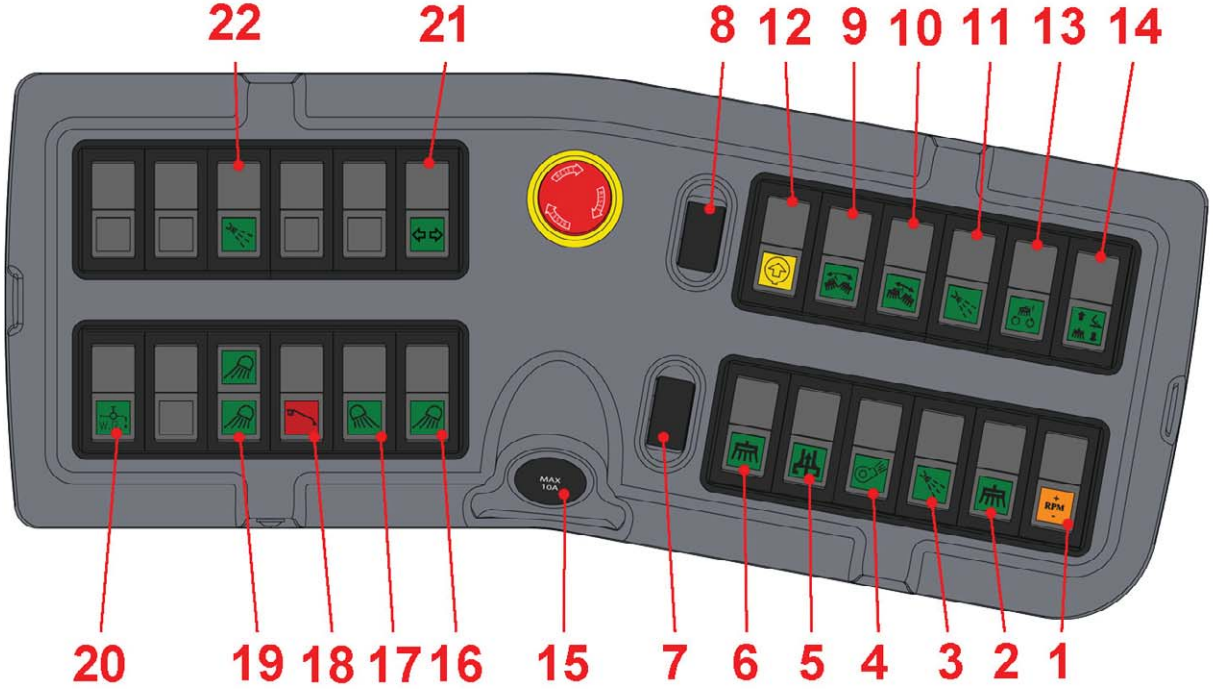
In addition to the spraywater provision to the brushes, the spraywater provision in the suction nozzle is now also switched on.

D. 4.4 Fan switch

The fan switch (4) switches on the suction fan provided the Dump/Drive/Sweep switch (14) is set to Sweep.

D. 4.5 Suction nozzle switch, raise/lower

With the raise/lower suction nozzle switch (5) the suction nozzle can be adjusted up or down independently of the brushes,e.g. to suck up large quantities of leaves.In that case a bigger suction nozzle opening will be required.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D. 4.6 Brush switch (with 'independently lifting of left brush' option)

The brush switch (6) has three positions: option

D. 4.6.1 Position '0'/brush-drive off

The brush drive and spraywater provision are switched off.

D. 4.6.2 Position '1'/brush-drive on

The engine must be running and the Dump/Drive/Sweep switch (14) must be in the Sweep position

The left brush starts to rotate and is lowered.

D. 4.6.3 Position '2'/brush drive on and spraywater on

Switch the spraywater pump switch (3) on

The spraywater provision on the left brush and/or in the suction nozzle will start to spray (depending on the position of the spraywater pump switch).

D. 4.7 Brush speed regulator

This regulator (7) provides infinite adjustment of the rotational speed of the brushes.

⚠
WARNING
YOU MUST NOT ALLOW ANY PERSONS WITHIN THE RANGE OF THE THIRD BRUSH WHEN THIS THIRD BRUSH IS IN USE.

D. 4.8 Third brush speed regulator (option)

With this regulator (8) the rotation speed of the third brush can be continuously regulated from zero rpm/min to max.

D. 4.9 Third brush double angle adjustment switch (option)

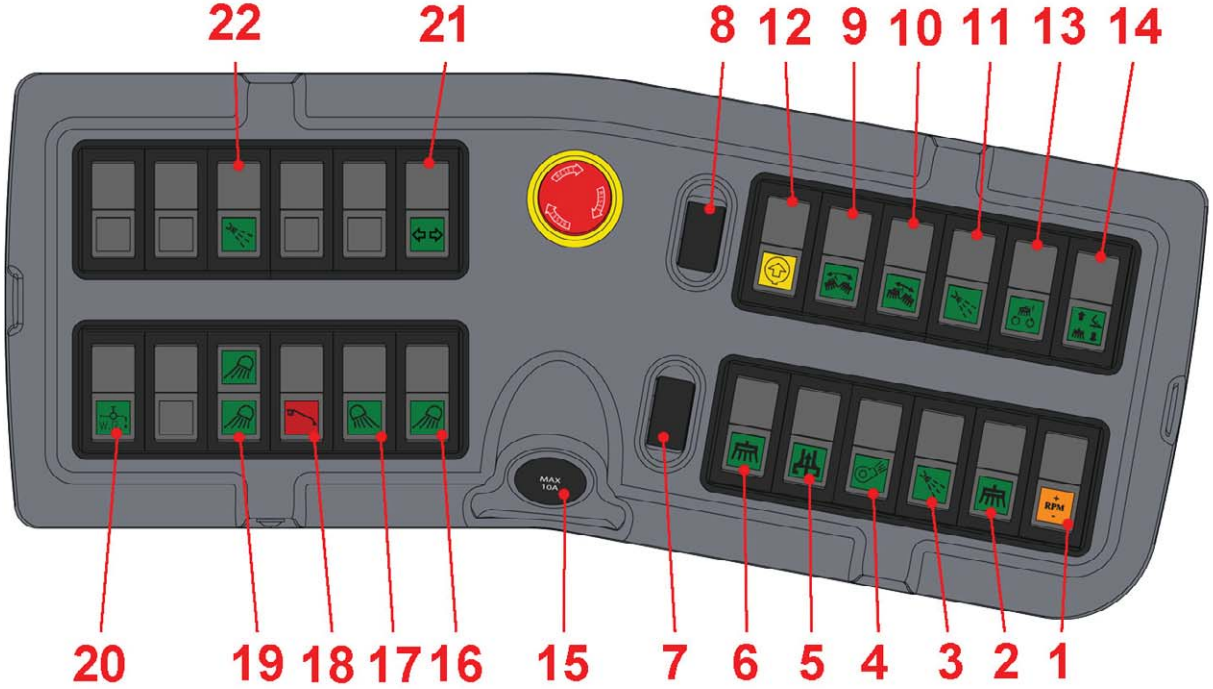
The angle (left/right) of the third brush can be adjusted with this regulator (9).

D. 4.10 Third brush angle adjustment regulator (option)

The angle (forward/backward) of the third brush can be adjusted with this regulator (10).

D. 4.11 Third brush spraywater switch (option)

This switch (11) releases the spraywater supply to the third brush.But before you do this you must switch on the water pump (3) and the brush drive on the door console (see Door Console Chapter).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D. 4.12 Ride-height control switch, front axle

With the ride-height control switch (12) for the front axle it is possible to temporarily bypass the automatic ride-height control.For instance if there is insufficient ground clearance or when a speed ramp or pavement has to be mounted.

Application of the ride-height control:

- Press the ride-height control switch for approx. 5 seconds
- The sweeper will lift
- The light in the switch lights up
- The sweeper remains elevated for approx. 25 seconds
- The light in the switch will switch off
- The sweeper will drop down.

NOTE
IN THIS ELEVATED POSITION YOU MUST NOT DRIVE FOR LONGER PERIODS AND/OR WITH A SPEED OF MORE THAN 4 KM/H.
DRIVING IN AN ELEVATED POSITION CAUSES MORE WEAR AND TEAR ON THE TYRES.
IF IT IS NECESSARY TO DRIVE FOR MORE THAN 15 SECONDS IN THE ELEVATED POSITION, YOU MUST PRESS THE RIDE-HEIGHT CONTROL SWITCH AGAIN AFTER THE LIGHT HAS SWITCHED ITSELF OFF.THE SWEEPER WILL THEN AGAIN LIFT FOR 15 SECONDS.
IF IT IS NECESSARY TO DRIVE FOR LESS THAN 15 SECONDS IN THE ELEVATED POSITION, YOU MUST PRESS THE RIDE-HEIGHT CONTROL SWITCH AGAIN WITHIN THE 15 SECONDS.THE SWEEPER WILL THEN DROP DOWN AGAIN TO ITS NORMAL DRIVE-HEIGHT.

D. 4.13 Third brush motor rotation direction switch

This switch (13) adjusts the rotation direction of the third brush.

This switch has three positions:

D. 4.13.1 Position ‘0’/centre position

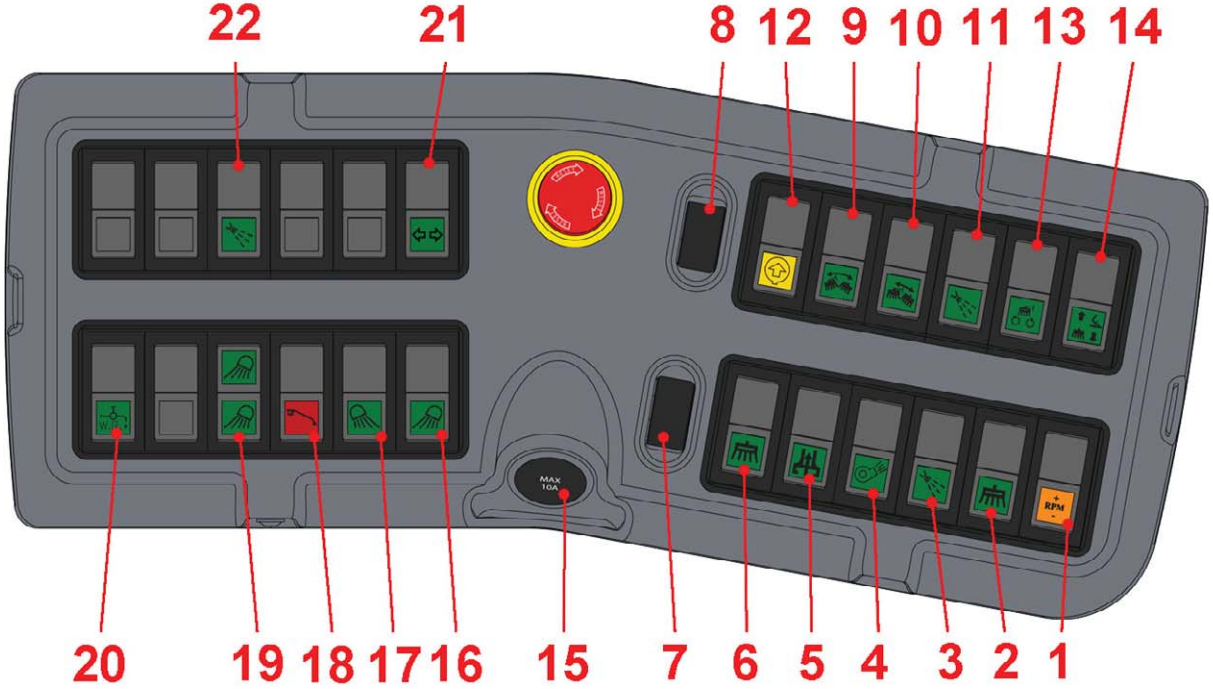
In this position the brush is at a standstill and the water supply is shut off

D. 4.13.2 Position ‘1’/up position

In this position the third brush rotates clockwise and the water supply is released, provided the spraywater switch (11) is switched on and the joystick for the third brush has been moved to the ‘brush down’ position

D. 4.13.3 Position ‘2’/down position

In this position the third brush rotates anti-clockwise and the water supply is released, provided the spraywater switch (11) is switched on and the joystick for the third brush has been move to the ‘brush down’ position.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D. 4.14 Dump/Drive/Sweep switch

The Dump/Drive/Sweep switch (14) makes it possible to choose between sweeping, driving or Dumping the container.

D. 4.14.1 Dump

In the Dump position the remote control for Dumping the container is switched on.

D. 4.14.2 Drive

In the Drive position the sweeping function is switched off and the brushes and suction nozzle are stowed away under the sweeper.

D. 4.14.3 Sweeping

In the Sweep position the sweeping function is switched on.Switches 7, 5, 2, 3, 6, 16 and 17 pre-select the settings with which sweeping is to be carried out.If the Dump/Drive/Sweep button is put in neutral, the sweeping function will be switched off and the brushes and suction nozzle will be stowed away under the sweeper.

D. 4.15 12V connection

This socket is intended for connection of 12-volt devices with a maximum draw of10A.

D. 4.16 Suction nozzle lighting switch/3rd brush lighting (option)

With the suction nozzle lighting switch (16) it is possible to switch on the suction nozzle lighting.This is only possible if the Dump/Drive/Sweep switch (14) is set to Sweep.It is also possible with this switch to switch on the third brush lighting (if present).

D. 4.17 Brush lighting, right/left

With this switch (17) it is possible to switch on the lighting on the left or right brush.This is only possible if the Dump/Drive/Sweep switch (14) is set to Sweep.

D. 4.18 High pressure water pump switch (option)/Swasher (option)

This switch (18) switches on the high-pressure water pump.This is only possible if the Dump/Drive/Sweep switch (14) is set to Dump.This switch (18) switches on the swasher system.This is only possible if the Dump/Drive/Sweep switch (14) is set to Sweep.

D. 4.19 Operating light(s) (option)

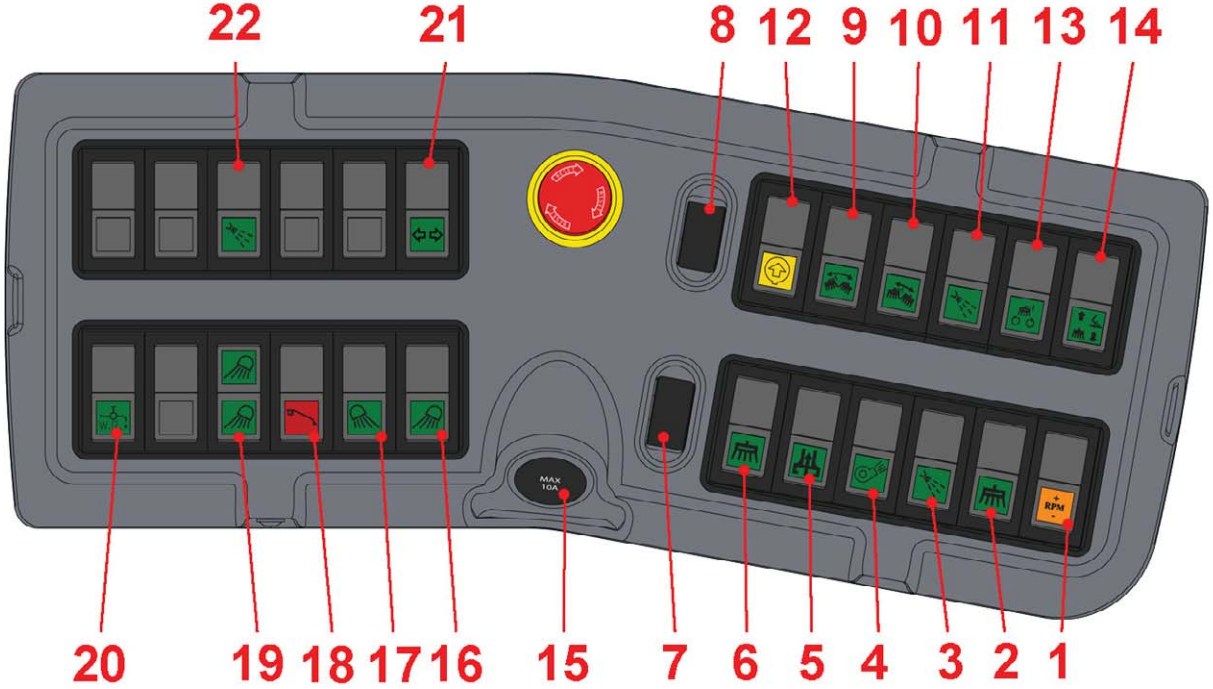
This switch (19) activates the worklamps on the machine.

D. 4.19.1 Front

Moving this switch to the front position activates the worklamps at the front of the machine.Press the switch in this direction again to switch off the worklamps.

D. 4.19.2 Rear

Moving this switch to the rear position activates the worklamps at the rear of the machine.Press the switch in this direction again to switch off the worklamps.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D. 4.20 Water recirculation system (option)

The water recirculation system can be activated using this switch (20).

D. 4.21 Brush angle adjustment left (option)

This switch (21) activates the left-side brush angle adjustment.

D. 4.22 Suction nozzle camera (option)

The suction nozzle camera (22) has two positions: standard

D. 4.22.1 Position ‘0’/suction nozzle camera off

The suction nozzle camera and spraywater provision are switched off.

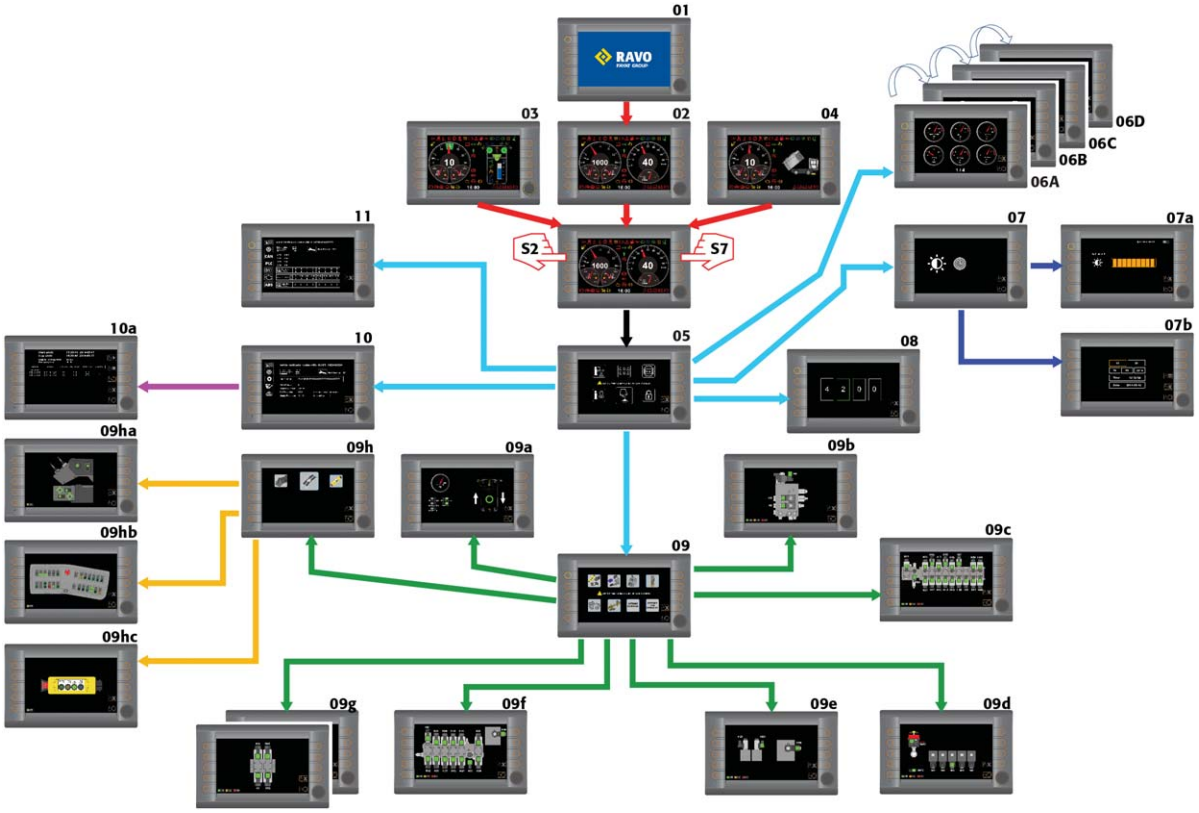
D. 4.22.2 Position ‘1’/suction nozzle camera on

The suction nozzle camera is switched on.

D. 4.22.3 Position ‘1+’/suction nozzle camera spraywater on

Keep the button pressed and the spraywater provision is activated.

The spraywater provision on the suction nozzle will start to spray (depending on the position of the spraywater pump switch).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09d

D. 5 iSystem

The RAVO sweeper is equipped with the RAVO iSystem.This iSystem displays information about the mode and status of the sweeper and its systems.The iSystem contains 3 levels.The general Dump/Drive/Sweep level, the driver's information level and the dealer level.Only the general Dump/Drive/Sweep level and driver's information level are described here.

The general Dump/Drive/Sweep level is the level that is displayed on the iSystem LED display by default when starting the sweeper, depending on the selected mode (Dump/Drive/Sweep).

WARNING
ONLY START THE DRIVER'S INFORMATION LEVEL IF THE MACHINE IS PARKED IN A SAFE PLACE.

The driver's information level can be activated by simultaneously pressing selection buttons S2 and S7 on the iSystem LED display.This will start the main menu of the driver's information level.The screens of the driver's of information level will be described separately.

D. 5.1 Function keys

Certain screens of the iSystem can be accessed through the function keys.These keys are located on the iSystem LED display.The functions of the function keys will be described one at a time.

D. 5.2 Information screens

Certain screens of the iSystem have additional associated information screens that can be activated using the information function key, S1.The function of this function key depends on the selected screen.

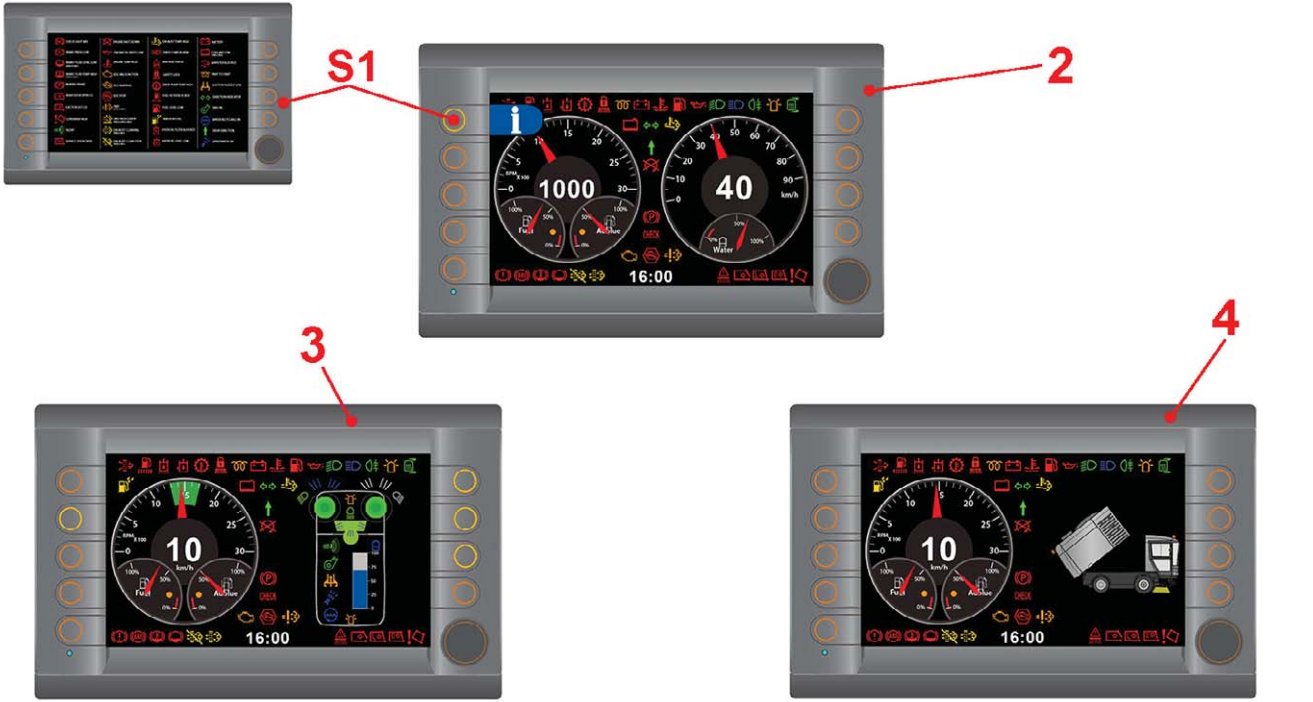
1
RAVO
FAYAT GROUP

D. 5.3 Start-up screen (1)

The start-up screen (1) will be visible during starting of the sweeper.Once the iSystem is ready, this screen will be replaced by one of the standard screens (Dump/Drive/Sweep).This may take a few seconds.

NOTE

WHEN THE SWEEPER IS SWITCHED OFF, THE ISYSTEM LED DISPLAY WILL REMAIN ACTIVE FOR FIVE MINUTES.THE DISPLAY WILL SWITCH OFF AUTOMATICALLY AFTER FIVE MINUTES.


S1
2
3
4
1000
40
16:00
10
16:00
10
16:00

D. 5.4 Driving screen (2)

The Driving screen (2) will be displayed first after starting the sweeper.This displays all the important sweeper system information during driving.

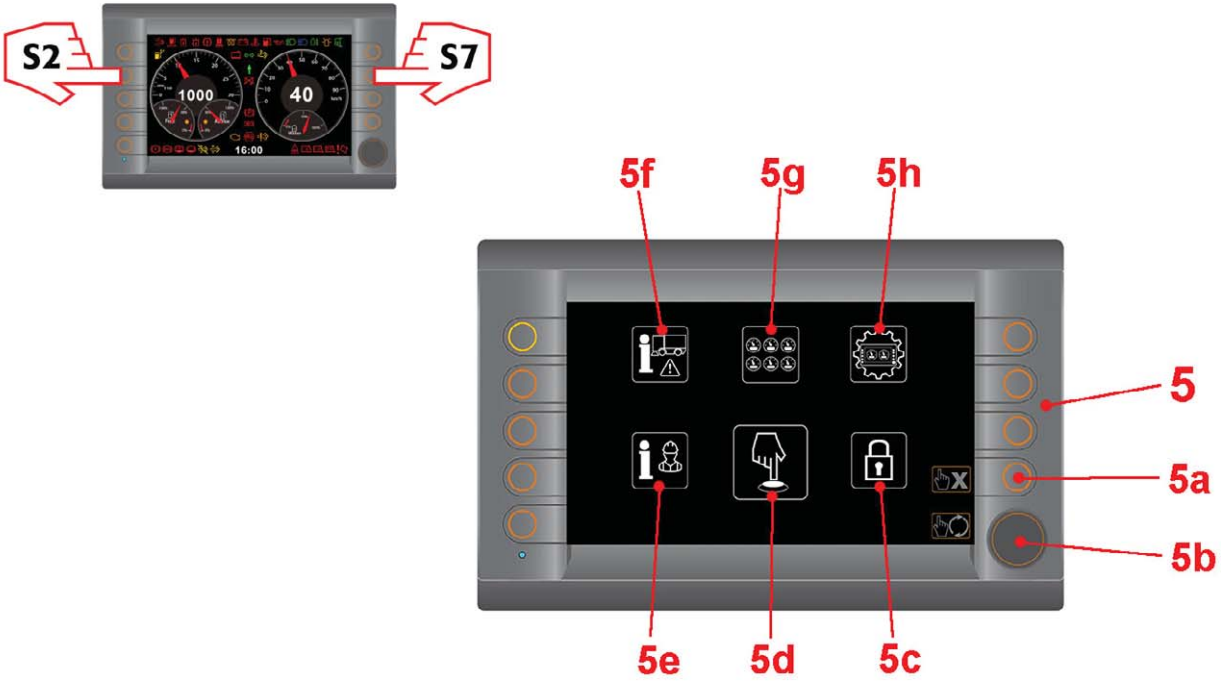
D. 5.5 Sweeping screen (3)

When the Sweeping mode is selected the Sweeping (3) screen will be shown.This displays all the important sweeper system information during sweeping.

D. 5.6 Dumping screen (4)

When the Dumping mode is selected the Dumping (4) screen will be shown.This displays all the important sweeper system information during Dumping of the container.

⚠
NOTE
THE DUMP/DRIVE/SWEEP SCREENS HAVE AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


S2
S7
1000
40
16:00
5f
5g
5h
5
5a
5b
5e
5d
5c

D. 5.7 Main menu screen (5)

Pressing keys S2 and S7 simultaneously takes you to the main menu of the driver's information level.The various choices in this menu can be selected and activated with the rotation/selection knob (5b).By turning the knob (5b) you can scroll through the menu items; by pressing the button (5b) the selected option can be activated.

D. 5.7.1 Exit key (5a)

Pressing the exit button (5a) exits the main menu screen and returns to the Dump/Drive/Sweep screens.

D. 5.7.2 Rotation/selection knob (5b)

The various choices in this menu can be selected and activated with the rotation/selection knob (5b).

D. 5.7.3 Dealer level (5c)

This choice leads to the dealer login screen.This is not intended for the driver and will not be discussed further.

D. 5.7.4 Switch control (5d)

This choice leads to the switch control menu.Here, additional selections are made to test all control switches.

D. 5.7.5 Driver's information (5e)

This choice leads to the driver's information screen.This is where the machine configuration and iSystem information are found.

D. 5.7.6 Machine diagnostics (5f)

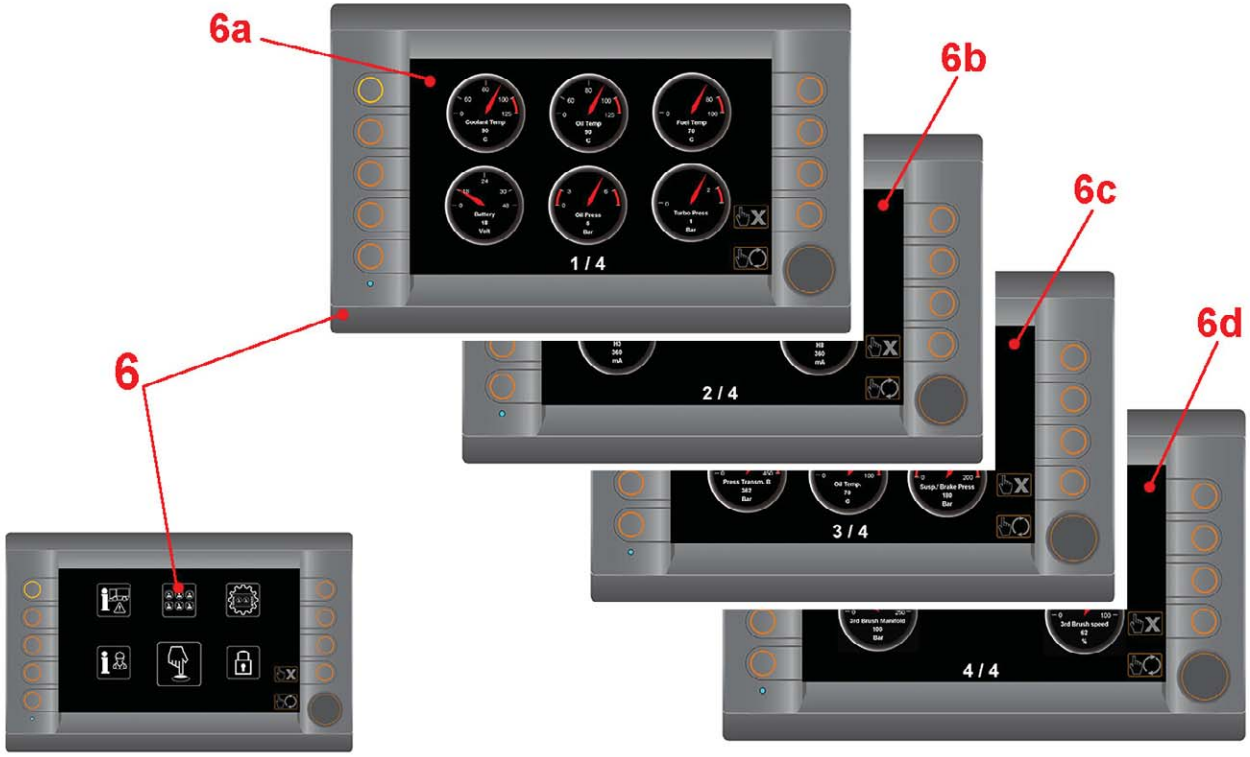
This choice leads to the driver's diagnostic screen.This is where system information and fault codes are shown.

D. 5.7.7 Telemetry (5g)

This choice leads to the driver's telemetry screens.Technical data for the engine and systems are shown here on several screens.

D. 5.7.8 iSystem LED display configuration screen (5h)

This choice leads to the driver's iSystem configuration screen.This is where the clock and the brightness of the screen can be set.


6a
6b
6c
6d
6
1 / 4
2 / 4
3 / 4
4 / 4

D. 5.8 iSystem telemetry screens (6)

Selection (6) from the main menu leads to the telemetry screens.

D. 5.8.1 Telemetry screen 1 of 4 (6a)

Telemetry screen (6a) displays engine data.

D. 5.8.2 Telemetry screen 2 of 4 (6b)

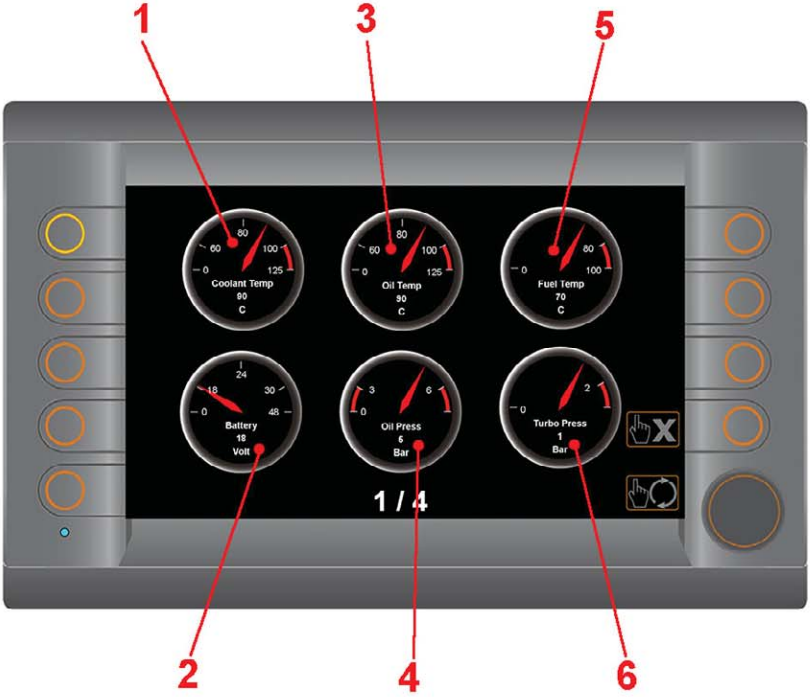
Telemetry screen (6b) displays drive system data.

D. 5.8.3 Telemetry screen 3 of 4 (6c)

Telemetry screen (6c) displays drive system data.

D. 5.8.4 Telemetry screen 4 of 4 (6d)

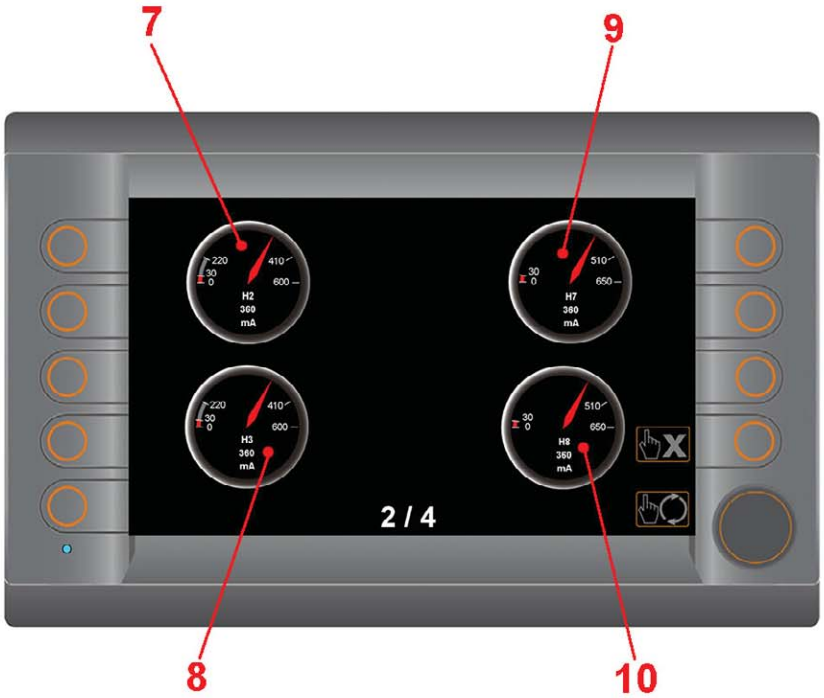
Telemetry screen (6d) displays brush system data.


1
3
5
Coolant Temp
90
C
Oil Temp
90
C
Fuel Temp
70
C
Battery
18
Volt
Oil Press
6
Bar
Turbo Press
1
Bar
1 / 4
2
4
6

D. 5.9 Telemetry screen (6a)

The following engine data can be read on telemetry screen (6a).

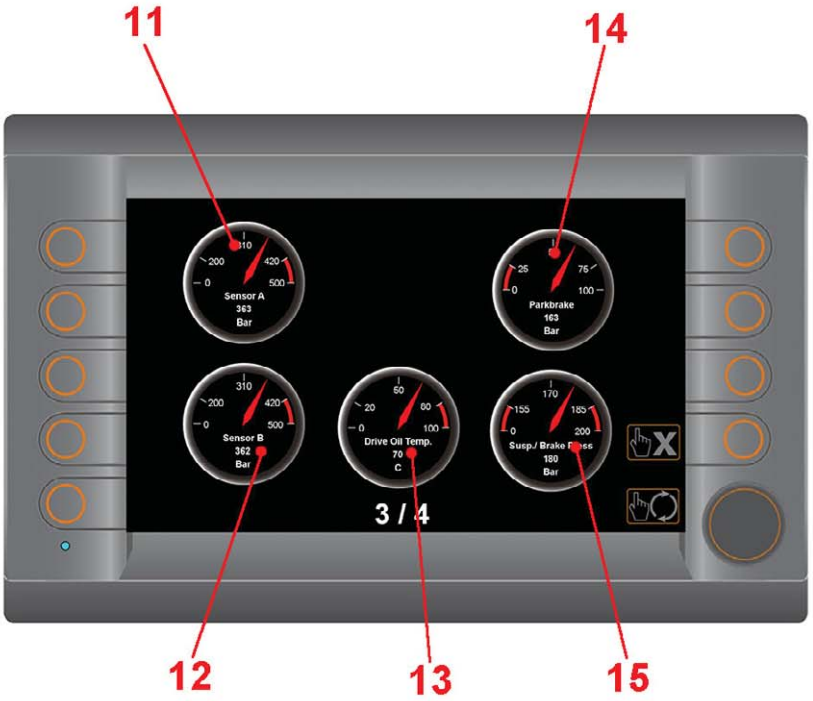
- 1 Engine coolant temperature
- 2 Battery voltage
- 3 Engine oil temperature
- 4 Engine oil pressure
- 5 Fuel temperature
- 6 Turbo pressure


7
9
220
30
0
410
600
H2
360
mA
510
650
H7
380
mA
H3
H8
2 / 4
8
10

D. 5.10 Telemetry screen (6b)

The following drive system data can be read on telemetry screen (6b).

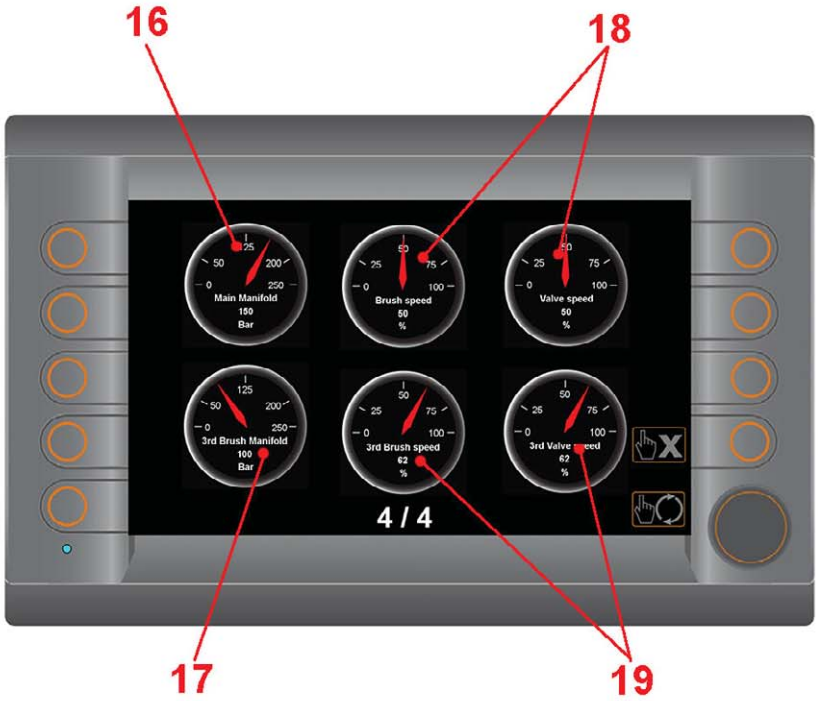
- 7 Flow drive pump valve forward
- 8 Flow drive pump valve reverse
- 9 Flow drive pump valve left
- 10 Flow drive pump valve right


11
14
Sensor A
363
Bar
Parkbrake
163
Bar
Sensor B
362
Bar
Drive Oil Temp.
70
C
3 / 4
12
13
15

D. 5.11 Telemetry screen (6c)

The following drive system data can be read on telemetry screen (6c).

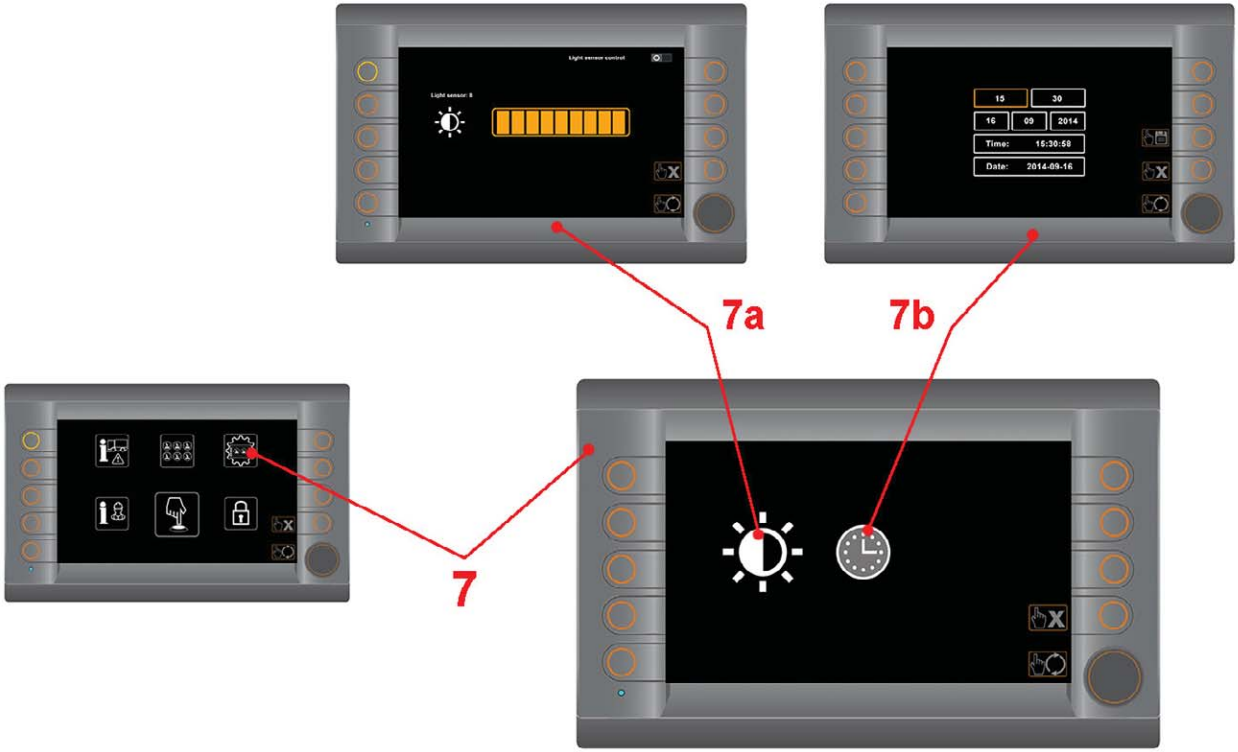
- 11 Drive system pressure sensor A
- 12 Drive system pressure sensor B
- 13 Drive system oil temperature
- 14 Parking brake fluid pressure
- 15 Oil pressure suspension/brake system


16
18
Main Manifold
150
Bar
Brush speed
50
%
Valve speed
50
%
3rd Brush Manifold
100
Bar
3rd Brush speed
62
%
3rd Valve speed
62
%
4 / 4
17
19

D. 5.12 Telemetry screen (6d)

The following brush system data can be read on telemetry screen (6d).

- 16 Oil pressure, main valve, brush system
- 17 Oil pressure, valve block, third brush
- 18 Rotational speed, brushes
- 19 Rotational speed, third brush


7a
7b
7

D. 5.13 Display settings menu (7)

Selection (7) from the main menu leads to the display settings menu.Here you can adjust the clock and screen settings.

D. 5.13.1 Screen brightness (7a)

The brightness of the display can be set manually on the screen (7a) or automatically by the light sensor.

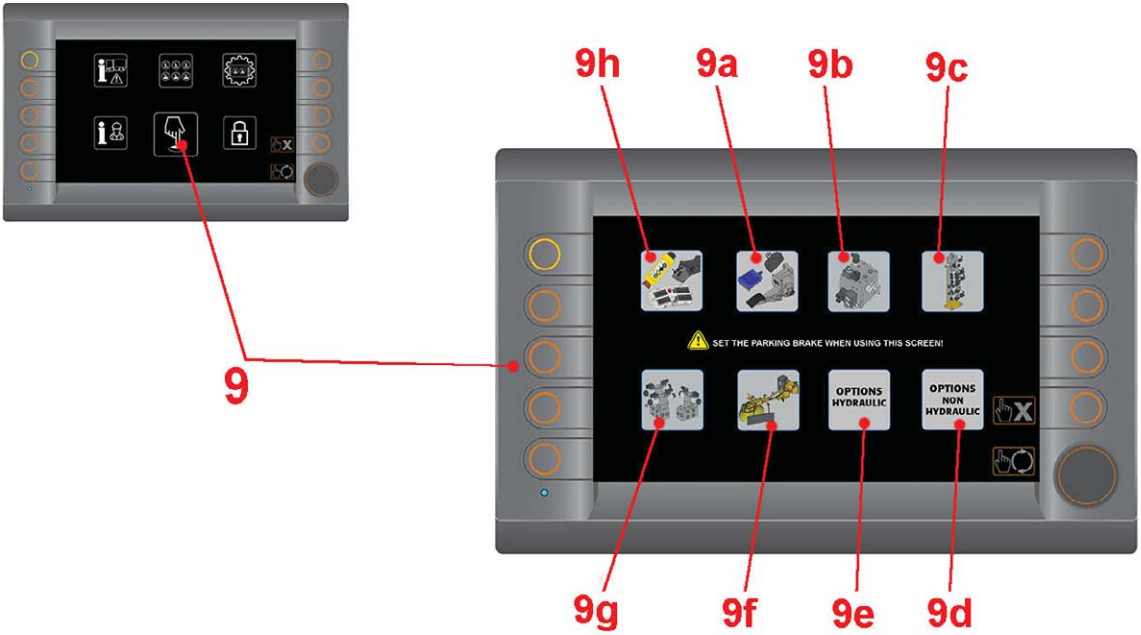
D. 5.13.2 setting the clock (7b)

On screen (7b) the clock can be set and the changes can be saved.

8
4
2
0
0

D. 5.14 Dealer login menu (8)

Selection (8) from the main menu leads to the dealer login menu.


9h
9a
9b
9c
9
SET THE PARKING BRAKE WHEN USING THIS SCREEN!
OPTIONS HYDRAULIC
OPTIONS NON HYDRAULIC
9g
9f
9e
9d

D. 5.15 iSystem check menu (9)

Selection (9) from the main menu leads to the iSystem check menu.Here you can check the system functions and components.

D. 5.15.1 Check screen pedal/switches and lights (9a)

On screen (9a) you can select the pedal/switches and lights check screen.

D. 5.15.2 Check screen brake and ride-height control (9b)

On screen (9b) you can select the brake and ride-height control check screen.

D. 5.15.3 Check screen main valve block brush system (9c)

On screen (9c) you can select the main valve block check screen.

D. 5.15.4 Check screen non-hydraulic options (9d)

On screen (9d) you can select the non-hydraulic options check screen.

D. 5.15.5 Check screen hydraulic options (9e)

On screen (9e) you can select the hydraulic option check screen.

D. 5.15.6 Check screen valve block third brush (9f)

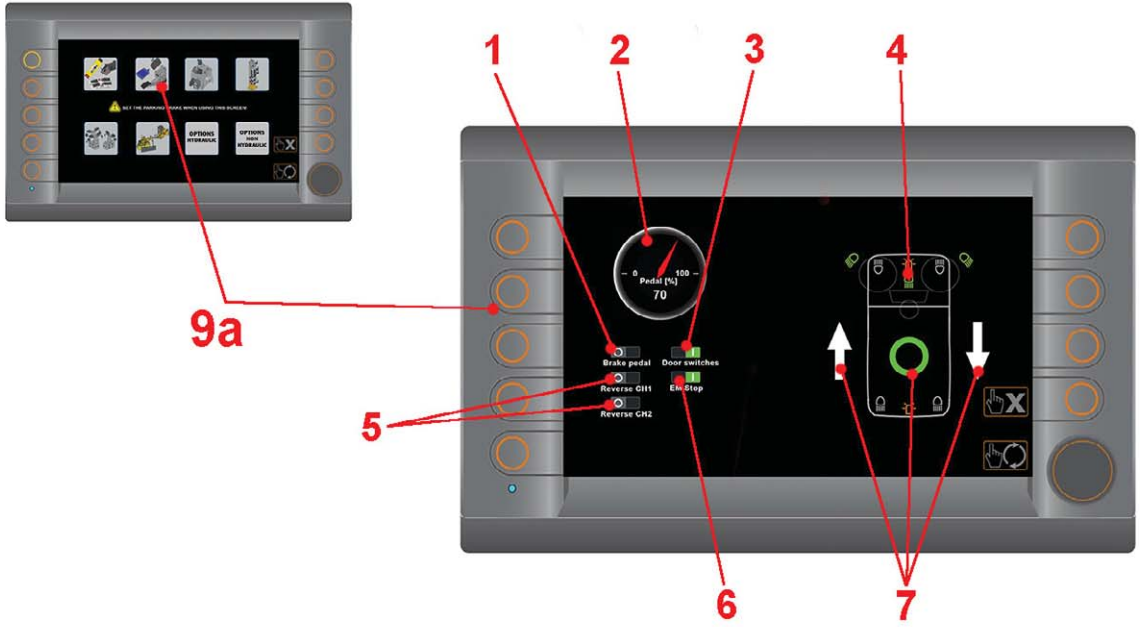
On screen (9f) you can select the valve block third brush check screen.

D. 5.15.7 Check screen container valve block (9g)

On screen (9g) you can select the container valve block check screen.

D. 5.15.8 Button check menu (9h)

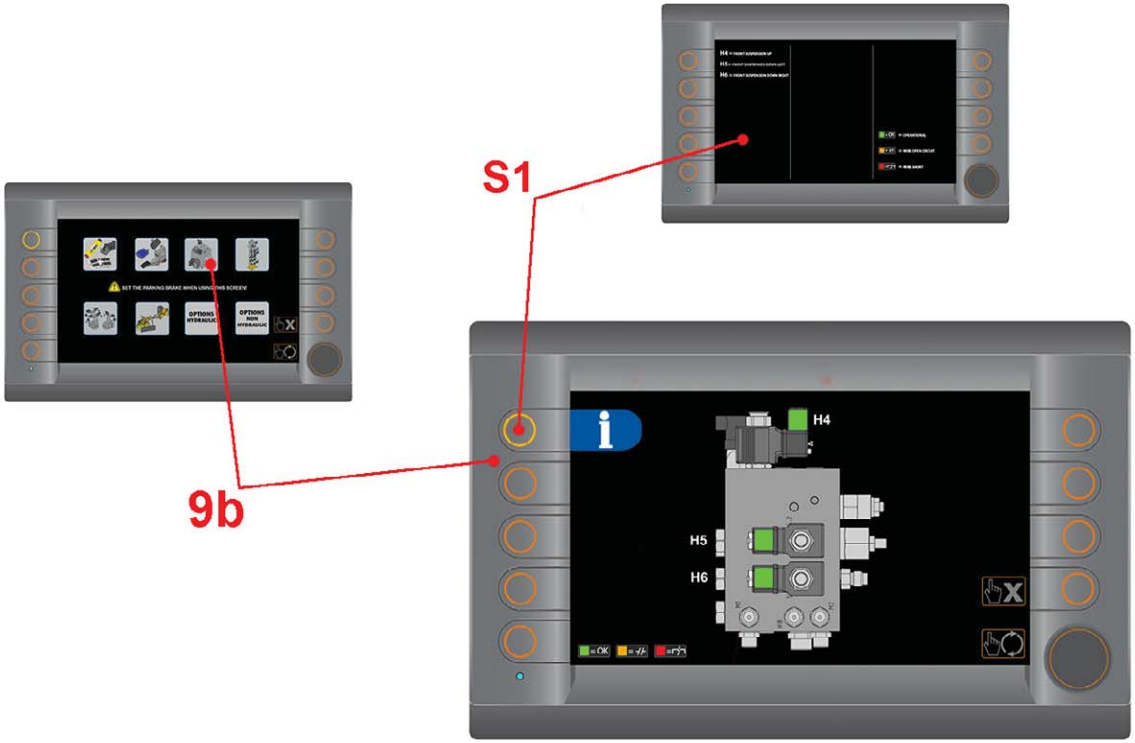
On screen (9h) you can select the button check menu.


1
2
3
4
9a
5
6
7
Pedal (%)
70
Brake pedal
Door switches
Reverse CH1
Reverse CH2

D. 5.16 Check screen pedal/switches and lights (9a)

The pedal/switch and lighting check screen shows the functions of the accelerator, brake and reverse pedals, the door switches and the lighting.

- 1 Brake pedal
- 2 Accelerator pedal
- 3 Door switches (one indicator for both switches)
- 4 Work lighting
- 5 Reverse pedal channel 1 and channel 2
- 6 Emergency stops (dashboard and container remote control)
- 7 Driving direction switch position


S1
9b
H4
H5
H6

D. 5.17 Check screen brake and ride-height control (9b)

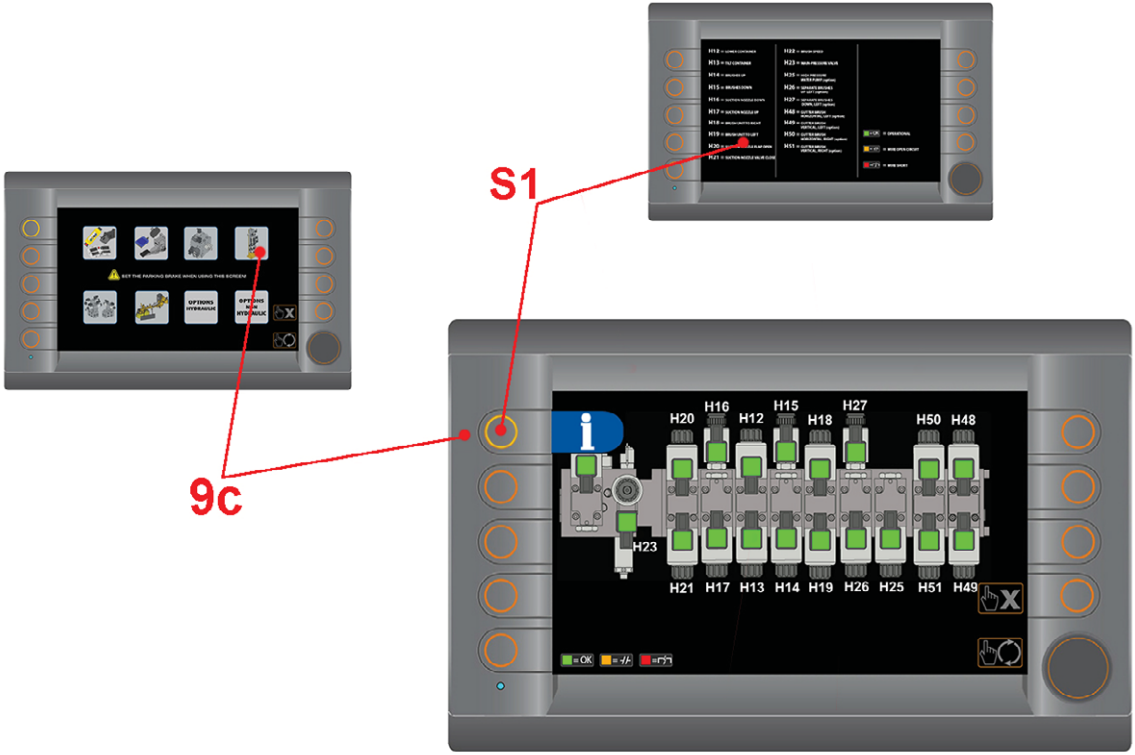
The brake and ride-height check screen shows the function parameters of the brake and ride-height control valves.Green = OKAmber = Open circuit Red = Short circuit

D. 5.17.1 Explanation of valves

- H4 = Front wheel suspension up (manually)
- H5 = Front wheel suspension down left (automatic)
- H6 = Front wheel suspension down right (automatic)

NOTE

THE BRAKE AND RIDE-HEIGHT CONTROL SCREEN HAS AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


S1
9c
H20
H16
H12
H15
H18
H27
H50
H48
H23
H21
H17
H13
H14
H19
H26
H25
H51
H49
OK

D. 5.18 Check screen main valve block brush system (9c)

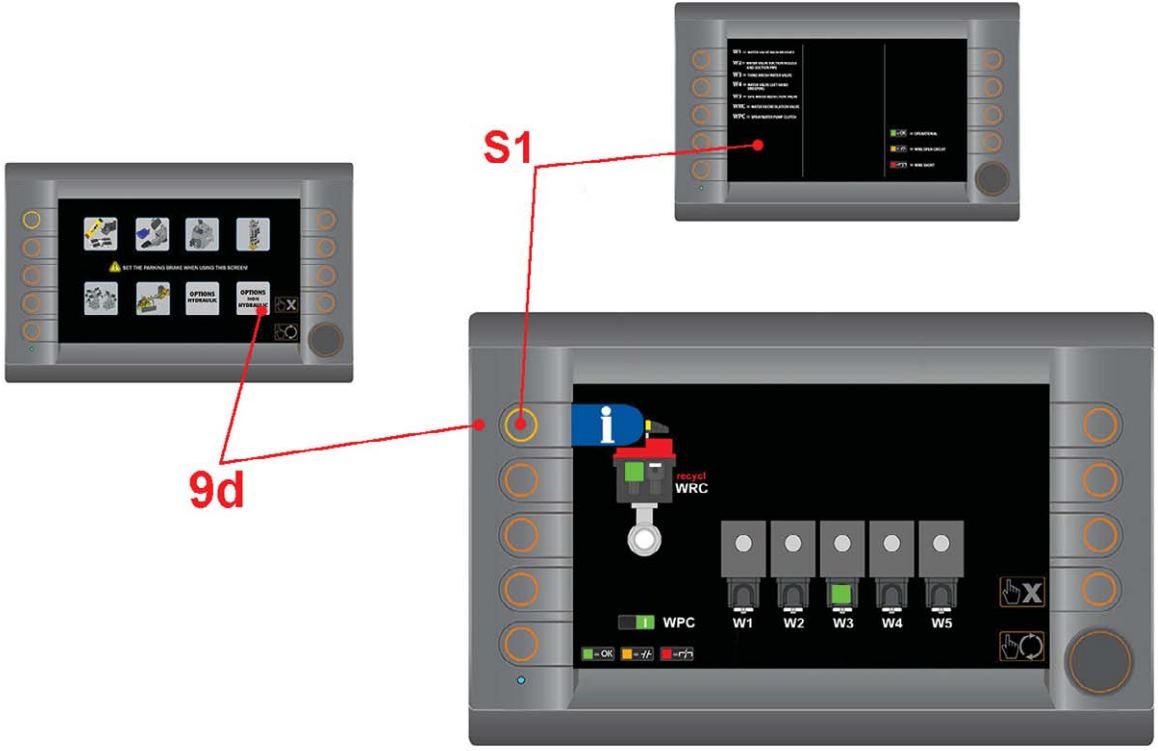
The main valve block brush system check screen shows the function parameters of the main valves for the brushes.Green = OKAmber = Open circuit Red = Short circuit

D. 5.18.1 Explanation of valves

- H12 = Lower container
- H13 = Tilt container
- H14 = Brushes up
- H15 = Brushes down
- H16 = Suction nozzle down
- H17 = Suction nozzle up
- H18 = Brush unit to right
- H19 = Brush unit to left
- H20 = Suction nozzle flap open
- H21 = Suction-nozzle valve close
- H22 = Brush speed
- H23 = Main-pressure valve
- H25 = High-pressure water pump (option)
- H26 = Separate brushes, up, left (option)
- H27 = Separate brushes, down, left (option)
- H48 = Gutter brush, horizontal, left (option)
- H49 = Gutter brush, vertical, left (option)
- H50 = Gutter brush, horizontal, right (option)
- H51 = Gutter brush, vertical, right (option)

NOTE

THE MAIN VALVE BLOCK BRUSH SYSTEM SCREEN HAS AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


S1
9d
WRC
WPC
W1
W2
W3
W4
W5

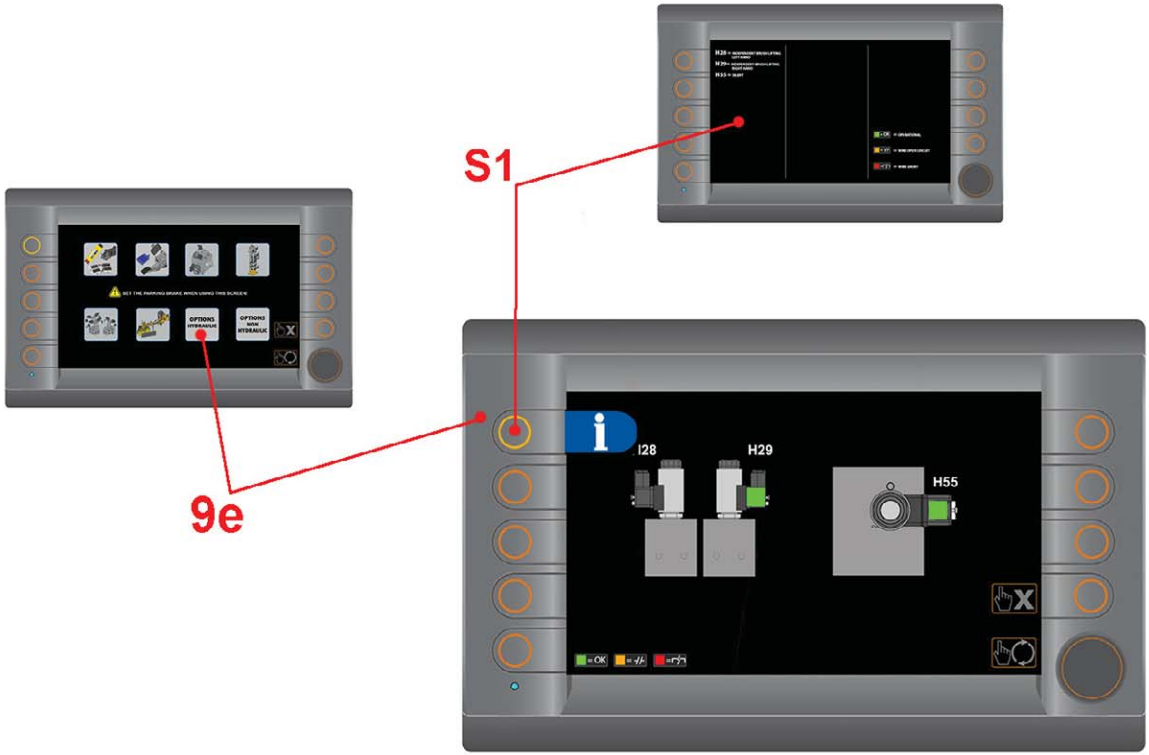
D. 5.19 Check screen non-hydraulic options (9d)

The non-hydraulic options check screen (9d) shows the function parameters of the water valves, spraywater pump clutch and water recirculation valve.Green = OKAmber = Open circuit Red = Short circuit

D. 5.19.1 Explanation of valves

- W1 = Water valve, brushes
- W2 = Water valve, suction nozzle and suction tube
- W3 = Water valve, third brush (option)
- W4 = Water valve, left sweeping (option)
- W5 = Water valve, 50% reduction (option)
- WPC = Spraywater pump clutch
- WRC = Water recirculation valve

⚠
NOTE
THE NON-HYDRAULIC OPTIONS SCREEN HAS AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


S1
9e
I28
H29
H55

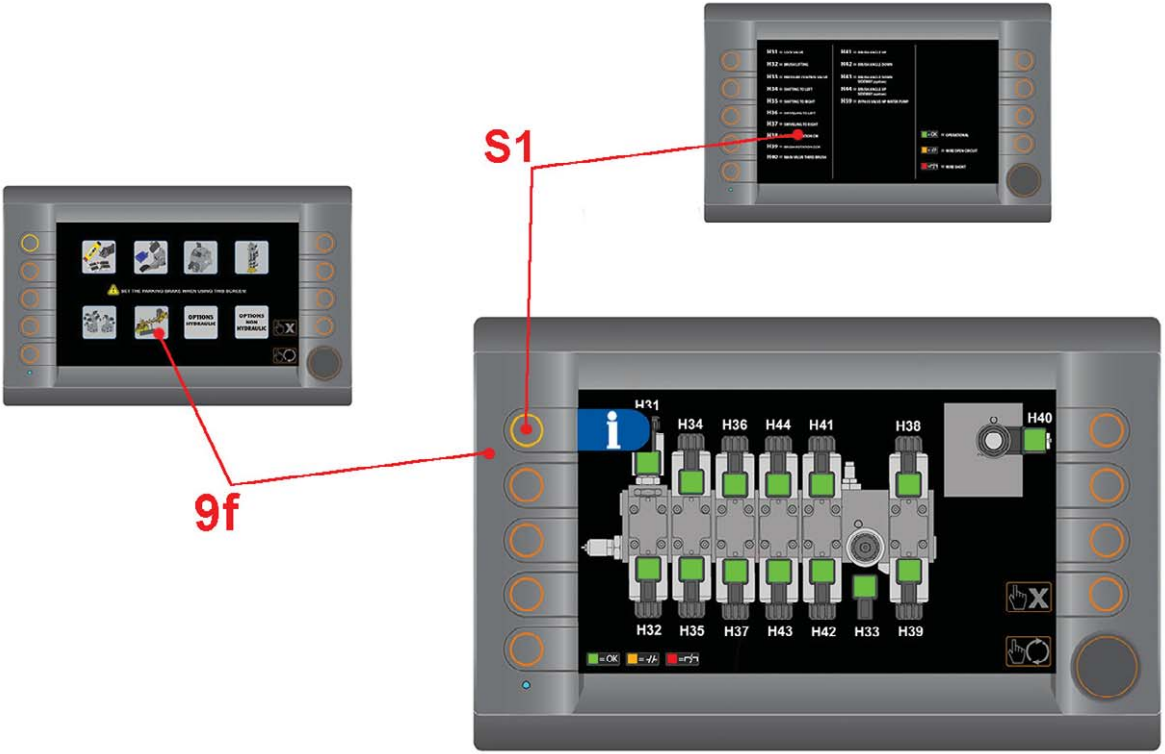
D. 5.20 Check screen hydraulic options (9e)

The hydraulic options screen (9e) shows the function parameters of the hydraulic options silent and independent brush lifting.Green = OKAmber = Open circuit Red = Short circuit

D. 5.20.1 Explanation of valves

- H28 = Independent brush lifting left
- H29 = Independent brush lifting right
- H55 = Noise reduction (silent)

NOTE
THE HYDRAULIC OPTIONS SCREEN HAS AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


S1
9f
H31
H34
H36
H44
H41
H38
H40
H32
H35
H37
H43
H42
H33
H39

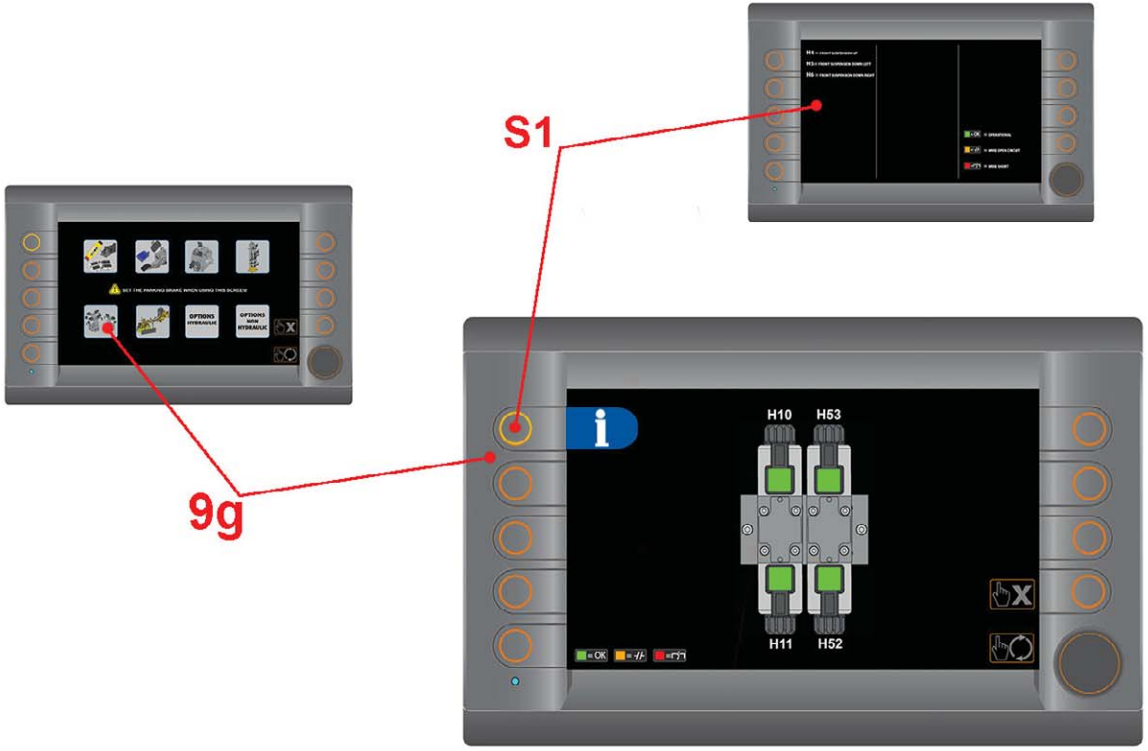
D. 5.21 Check screen valve block third brush (9f)

The valve block third brush system check screen (9f) shows the function parameters of the third brush valves.Green = OKAmber = Open circuit Red = Short circuit

D. 5.21.1 Explanation of valves

- H31 = Shut-off valve
- H32 = Raise brush
- H33 = Pressure-control valve
- H34 = Slide to left
- H35 = Slide to right
- H36 = Swivel to left
- H37 = Swivel to right
- H38 = Brush rotation, clockwise
- H39 = Brush rotation, anti-clockwise
- H40 = Main valve, third brush
- H41 = Brush angle up
- H42 = Brush angle down
- H43 = Brush angle up sideways (option)
- H44 = Brush angle down sideways (option)

⚠
NOTE
THE VALVE BLOCK THIRD BRUSH SYSTEM SCREEN HAS AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


S1
9g
H10
H53
H11
H52

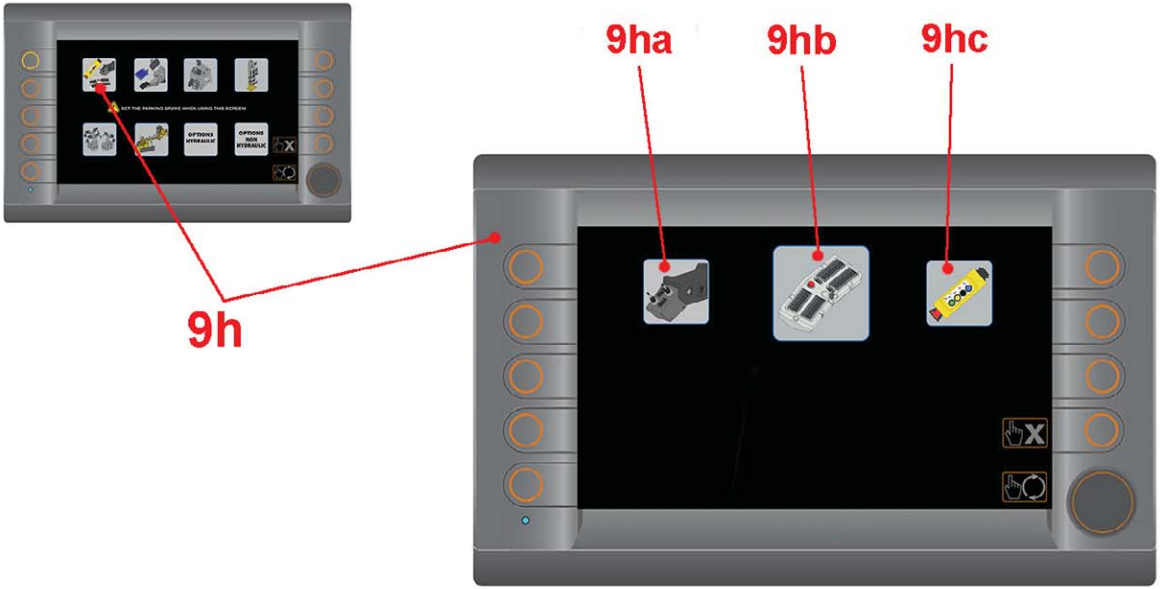
D. 5.22 Check screen valve block container (9g)

The valve block container check screen (9g) shows the function parameters of the container valves.Green = OKAmber = Open circuit Red = Short circuit

D. 5.22.1 Explanation of valves

- H10 = Container door open
- H11 = Container door closed
- H52 = Container pusher extended (CD version)
- H53 = Container pusher retracted (CD version)

⚠
NOTE
THE VALVE BLOCK CONTAINER SCREEN HAS AN INFO-SCREEN THAT CAN BE ACTIVATED WITH FUNCTION KEY S1.


9ha
9hb
9hc
9h

D. 5.23 Button check menu (9h)

Selection (9h) in the iSystem check menu is used to select the functions of all the controls and switches.This allows you to check system functions.

D. 5.23.1 Check screen armrest (9ha)

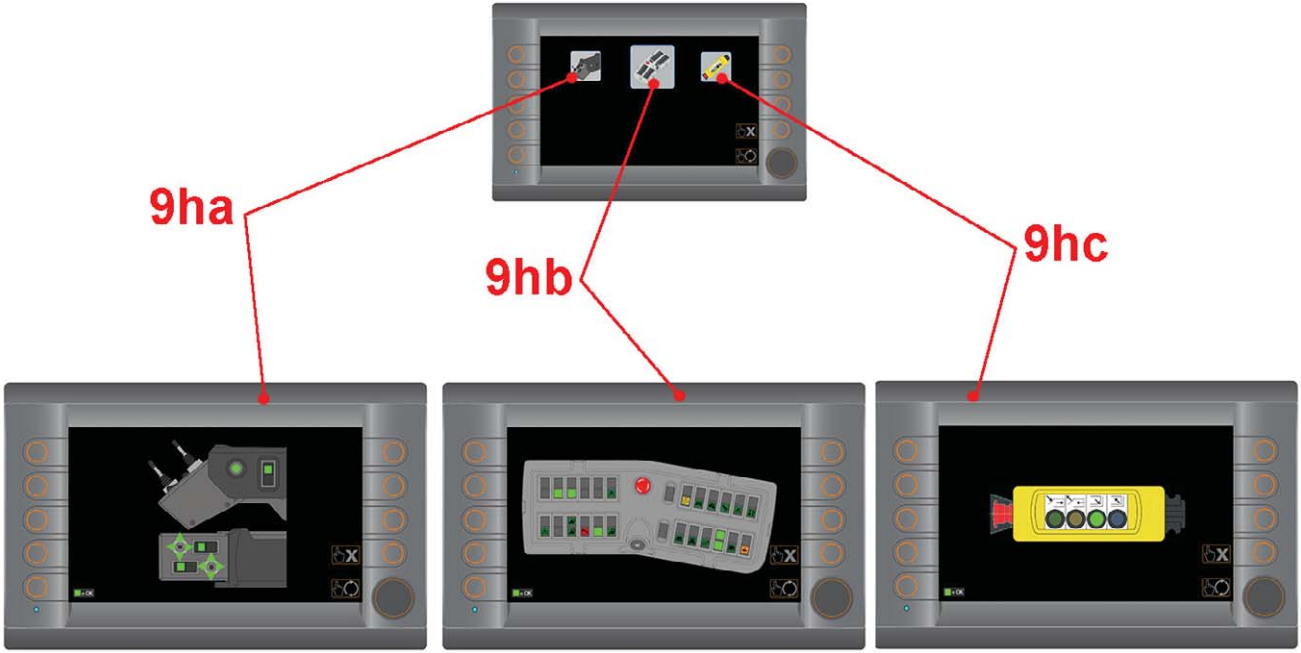
On screen (9ha) you can select the armrest switch check screen.

D. 5.23.2 Check screen dashboard (9hb)

On screen (7hb) you can select the dashboard check screen.

D. 5.23.3 Check screen remote control container (9hc)

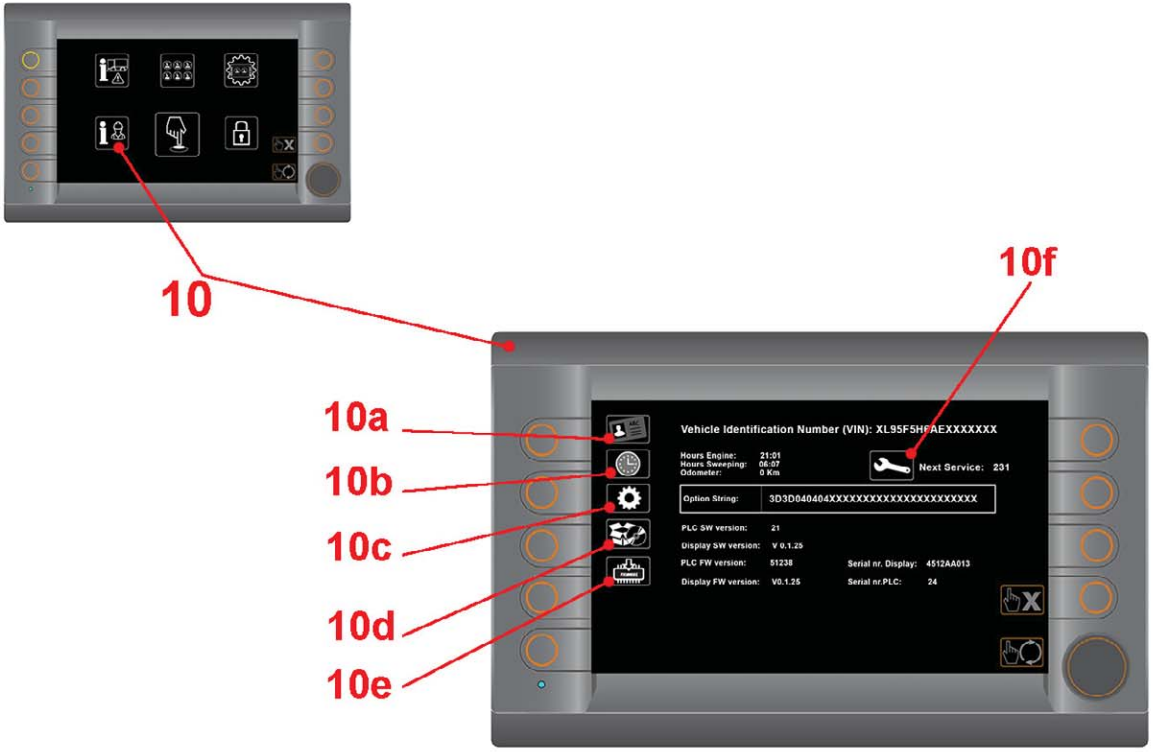
On screen (7hc) you can select the remote control check screen.


9ha
9hb
9hc

D. 5.24 Button check screen armrest (9ha)
The armrest button check screen (9ha) displays the function parameters of the switches and joysticks.Green = OK

D. 5.25 Button check dashboard (9hb)
The dashboard button check screen (9hb) displays the function parameters of the dashboard switches.Green = OK

D. 5.26 Button check remote control container (9hc)
The remote control container check screen (9hc) displays the function parameters of the control buttons.Green = OK


10
10f
10a
10b
10c
10d
10e
Vehicle Identification Number (VIN): XL95F5HEAEXXXXXXX
Hours Engine: 21:01
Hours Sweeping: 06:07
Odometer: 0 Km
Next Service: 231
Option String: 3D3D040404XXXXXXXXXXXXXXXXXXXXXX
PLC SW version: 21
Display SW version: V 0.1.25
PLC FW version: 51238
Serial nr. Display: 4512AA013
Display FW version: V0.1.25
Serial nr.PLC: 24

D. 5.27 Driver's information screen (10)

Selection (10) from the main menu leads to the driver's information screen.This screen provides relevant general information.

D. 5.27.1 Vehicle Identification Number (VIN) (10a)

The machine's VIN is shown here.

D. 5.27.2 Engine, sweeping hours meter and total distance travelled (10b)

The sweeper's current engine hours and sweeping hours are shown here.

D. 5.27.3 Option string (10c)

The option code is displayed here. You can use this code to determine which options are active on the sweeper.

D. 5.27.4 Software version PLC and display (10d)

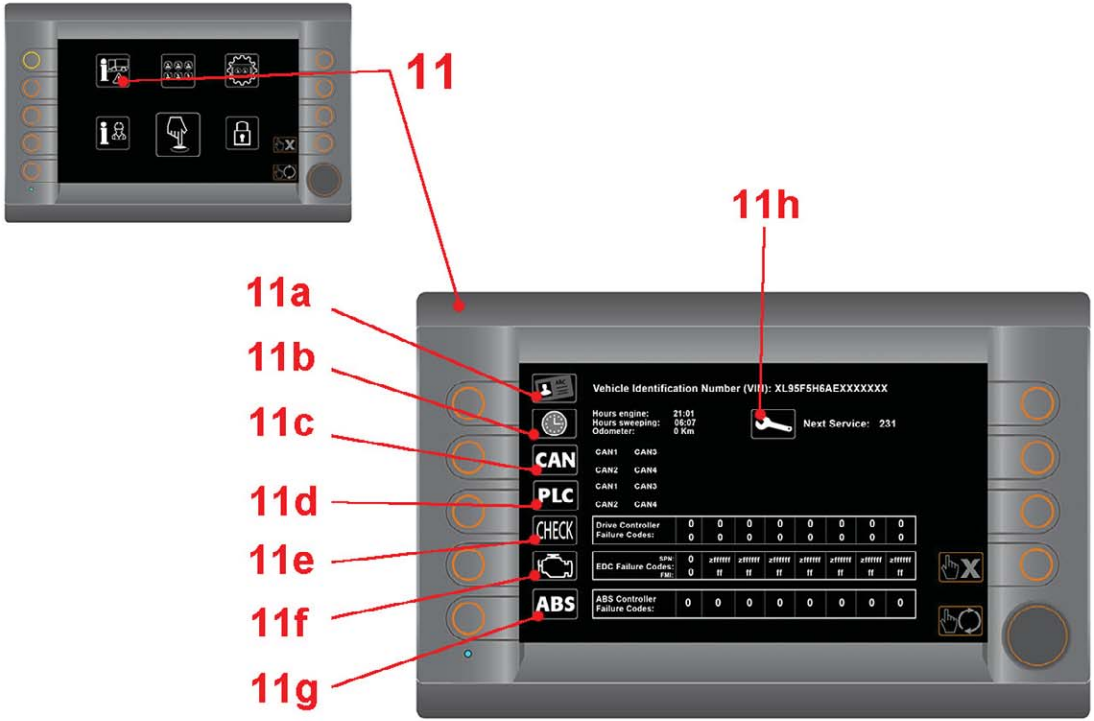
Information about the current software version for the PLC and the iSystem display are shown here.

D. 5.27.5 Firmware version PLC and display (10e)

Information about the current firmware version for the PLC and the iSystem display are shown here.

D. 5.27.6 Service interval meter (10f)

The remaining time before the next service interval is shown here.


11
11h
11a
11b
11c
11d
11e
11f
11g
Vehicle Identification Number (VIN): XL95F5H6AEXXXXXXX
Hours engine: 21:01
Hours sweeping: 06:07
Odometer: 0 Km
Next Service: 231
CAN
PLC
CHECK
ABS
Drive Controller Failure Codes:
EDC Failure Codes:
ABS Controller Failure Codes:

D. 5.28 Button check menu (11)

Selection (11) from the main menu leads to the driver's diagnostics screen.This screen displays relevant information about the systems.

D. 5.28.1 Vehicle Identification Number (VIN) (11a)

The machine's VIN is shown here.

D. 5.28.2 Engine, sweeping hours meter and total distance travelled (11b)

The sweeper's current engine hours and sweeping hours are shown here.

D. 5.28.3 Status CAN systems (11c)

The status of the CAN systems are presented as colour codes here.

- Grey = Inactive
- Green = OK
- Yellow = Timeout
- Orange = Fault detected
- Red = Bus fault

D. 5.28.4 Status PLC (11d)

The status of the PLC is presented as colour codes here.

- Grey = Inactive
- Green = OK
- Yellow = Timeout
- Orange = Fault detected
- Red = Bus fault

D. 5.28.5 Fault codes on-board computer (11e)

The last 8 fault codes from the on-board computer are shown here.

D. 5.28.6 Fault codes EDC and DCU (11f)

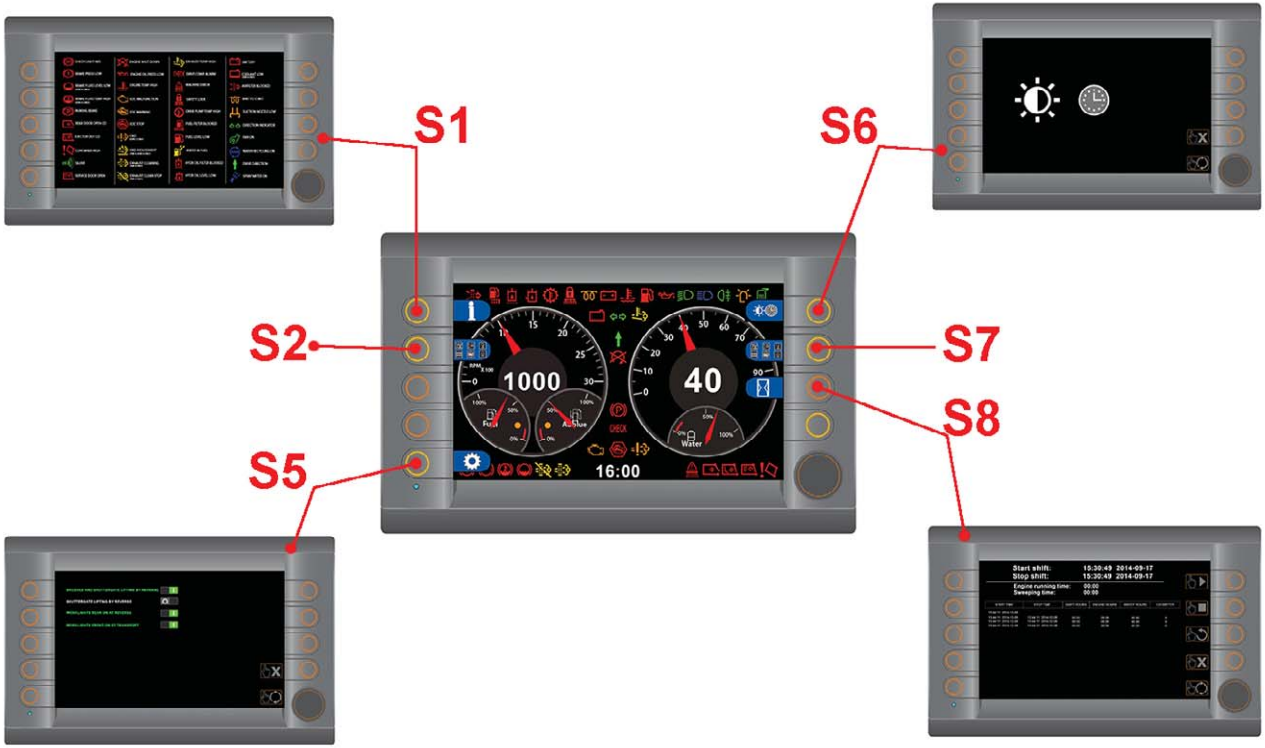
The last 8 fault codes from the EDC (Electronic Diesel Controller) and the DCU (Dosing Control Unit) as shown here.

D. 5.28.7 Fault codes ABS (11g)

The last 8 fault codes from the ABS are shown here.

D. 5.28.8 Service interval meter (11h)

The remaining time before the next service interval is shown here.


S1
S6
S2
S7
S8
S5
1000
40
16:00
Start shift: 15:30:49 2014-09-17
Stop shift: 15:30:49 2014-09-17
Engine running time: 00:00
Sweeping time: 00:00

D. 6 iSystem function keys

Certain screens of the iSystem can be accessed through the function keys.These keys are located on the iSystem LED display.The functions of the function keys will be described one at a time.

WARNING

ONLY START THE DRIVER'S INFORMATION LEVEL IF THE MACHINE IS PARKED IN A SAFE PLACE.

D. 6.1 Function keys S1 S2 S5 S6 S7 S8

Certain screens of the iSystem can be accessed through the function keys.These keys are located on the iSystem LED display.

D. 6.1.1 S1

Selecting function key S1 activates the info screen on the iSystem LED display.Depending on the screen, relevant information will be shown if available.

D. 6.1.2 S2

Function key S2 in combination with function key S7 activates the main menu screen.

D. 6.1.3 S5

Selecting function key S5 activates the machine parameter screen.Preconfigured settings can be adjusted here.

D. 6.1.4 S6

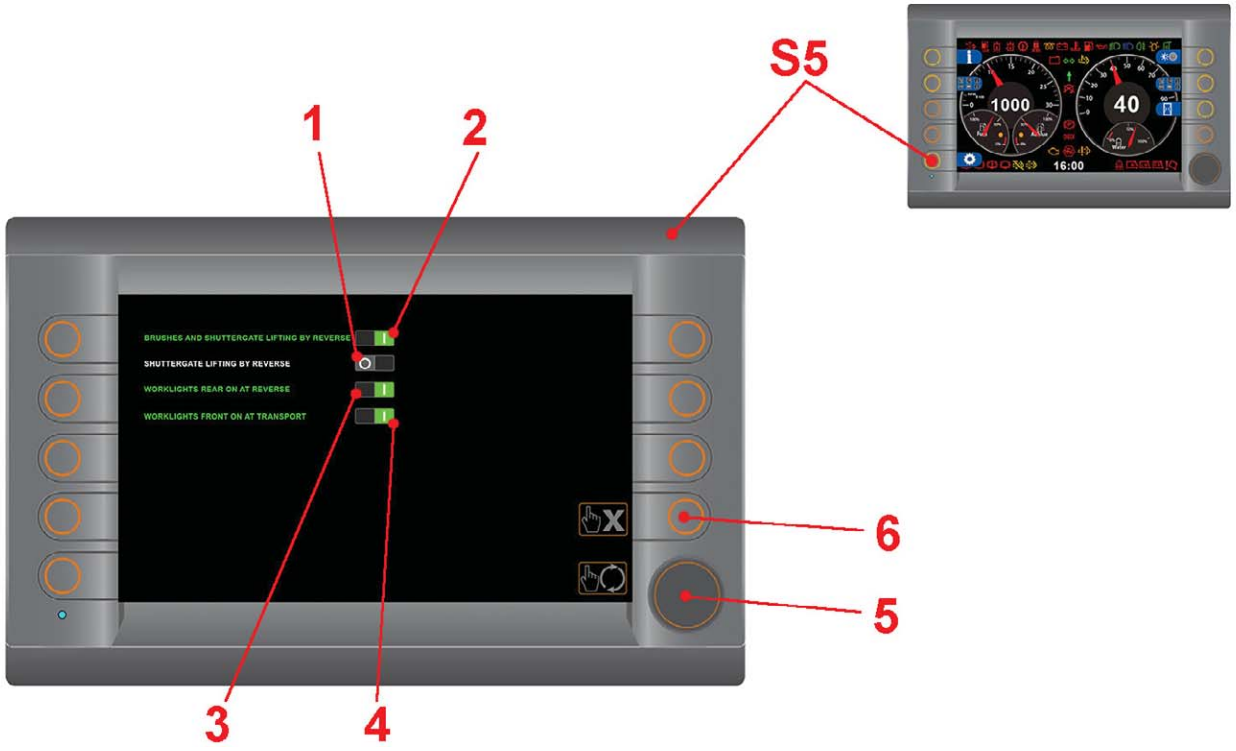
Selecting function key S6 activates the iSystem LED settings screen.Here you can adjust the clock and screen settings.

D. 6.1.5 S7

Function key S7 in combination with function key S2 activates the main menu screen.

D. 6.1.6 S8

Selecting function key S8 activates the work and trip clock screen.


S5
1
2
BRUSHES AND SHUTTERGATE LIFTING BY REVERSE
SHUTTERGATE LIFTING BY REVERSE
WORKLIGHTS REAR ON AT REVERSE
WORKLIGHTS FRONT ON AT TRANSPORT
6
5
3
4
1000
40
16:00

D. 6.2 Function key S5

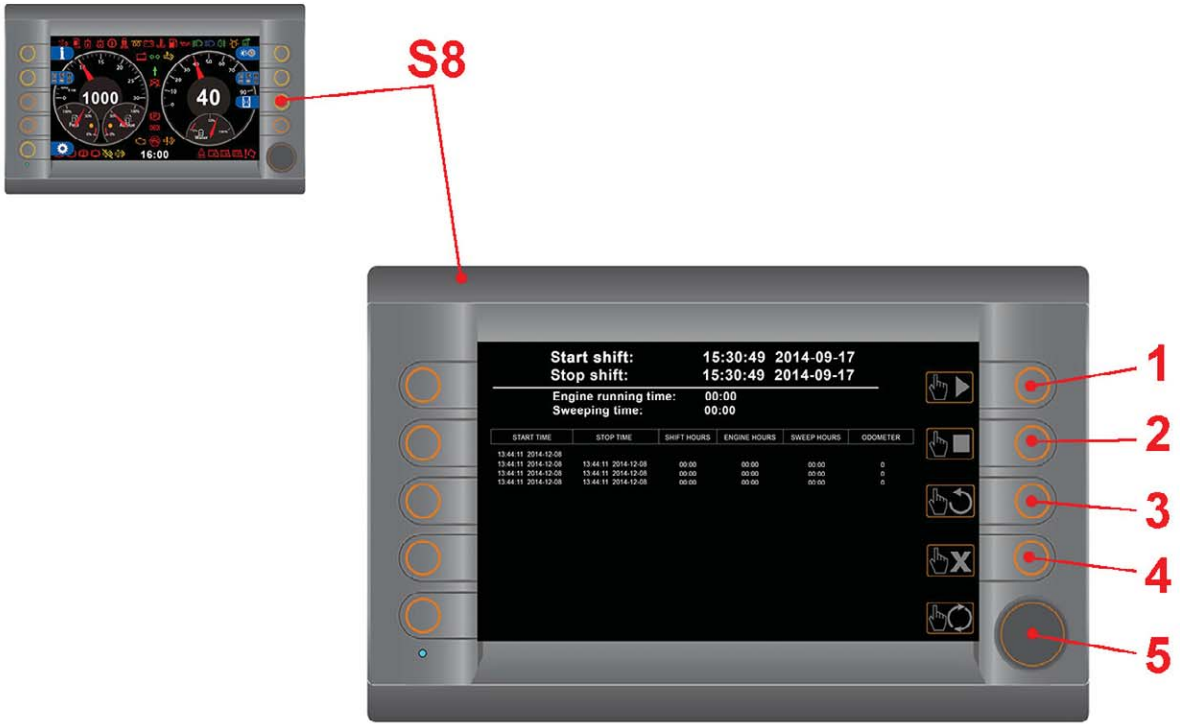
On the machine settings screen certain preconfigured settings can be enabled or disabled.The following settings are available:

- Brushes and suction nozzle flap raised in reverse on/off
- Suction nozzle flap raised in reverse on/off
- Worklamps rear on in reverse on/off
- Worklamps front on in transport on/off

D. 6.2.1 Operation machine settings screen

The rotation/selection knob (5) can be used to scroll between the different settings and choose from among the available options.

The exit button (6) takes you back to the selected mode (Dump/Drive/Sweep).


S8
1000
40
16:00
Start shift: 15:30:49 2014-09-17
Stop shift: 15:30:49 2014-09-17
Engine running time: 00:00
Sweeping time: 00:00
START TIME
STOP TIME
SHIFT HOURS
ENGINE HOURS
SWEEP HOURS
ODOMETER
1
2
3
4
5

D. 6.3 Function key S8

The work and trip clock screen keeps track of working and sweeping times.

D. 6.3.1 Operation work and trip clock screen

Button (1) activates the trip clock; it remains active even if the engine is switched off.The stop button (2) stops the trip clock and the measured time is stored in a line of text (up to 7 lines in total).The reset button (3) resets the trip clock screen and clears all the saved times.

Selections can be made with the rotation/selection knob (5).

The exit button (4) takes you back to the selected mode (Dump/Drive/Sweep).

3
8
7
1
5
2
6
4

D. 7 Steering column

The steering column is located on the right side of the cabin.The main controls for operating the sweeper are located on the steering column.

D. 7.1 Steering column adjustment (1)

The steering column can be adjusted closer to or further from the driver's seat using the steering column adjustment lever (1).

Steering column adjustment:

- Start the sweeper's engine
- Loosen the handle (1) a few turns
- Set the steering column to the desired position
- Tighten the handle firmly again
- Press the red button on the handle (1) to adjust the handle itself.

⚠
WARNING
NEVER ADJUST THE STEERING COLUMN WHILST DRIVING.

D. 7.2 Steering column handle (6)

The steering column switch (6) provides control of various functions, such as direction indicators, main beam (signal), horn, windscreen wipers and windscreen washer.

D. 7.2.1 Direction indicators

Moving the steering column switch (6) forwards or backwards activates the left and right direction indicators respectively.The indicator lamp on the LCD display panel will flash too.

D. 7.2.2 Main beam

Moving the steering column switch (6) downwards switches on the main beam.This only happens if the normal lighting and the ignition key are turned on.The indicator lamp for the main beam on the LCD display panel will light.

D. 7.2.3 Main beam flasher

Moving the steering column switch (6) upwards switches on the main beam signal.The steering column switch does not remain in this position; it always returns to its original position.The indicator lamp for the main beam on the LCD display panel will light.

D. 7.2.4 Horn

Pressing the button (5) at the end of the steering column switch (6) operates the horn.

3
8
7
1
5
2
6
4

D. 7.2.5 Windscreen washer

Pushing the push ring (2) at the end of the steering column switch (6) operates the windscreen washer and briefly activates the wipers.

D. 7.2.6 Windscreen wipers

Turning the twist knob (6) of the steering column switch (6) operates the windscreen wipers.The knob has the following positions:

D. 7.2.7 Position ‘0’

The windscreen wipers are off and are in the parked position

D. 7.2.8 Position ‘J’

The wipers cycle once every 10 seconds (interval).

D. 7.2.9 Position ‘I’

The windscreen wipers are turned on and run constantly at their lowest speed

D. 7.2.10 Position ‘II’

The windscreen wipers are turned on and run constantly at their highest speed

D. 7.3 Steering wheel (3)

The steering wheel (3) turns the wheels from lock-to-lock in about four revolutions.

⚠
WARNING
THE TURNING CIRCLE OF THE SWEEPER IS VERY SMALL.THE DRIVING SPEED IN CURVES SHOULD THEREFORE BE LIMITED.

D. 7.4 Ignition key switch (7)

The ignition key switch (7) is fitted centrally on the dashboard and has four positions:

D. 7.4.1 Position -1/radio position (to the left)

In this position the radio is provided with power

D. 7.4.2 Position 0/ignition off

In this position the complete sweeper is without power and the engine is switched off.Only in this position is it possible to insert the ignition key into the ignition key switch and remove it from this ignition key switch

D. 7.4.3 Position 1/ignition on

In this position the complete electrical equipment of the sweeper is switched on.After starting up the engine the key switch always returns to position 1

D. 7.4.4 Position 2/start the diesel engine

In this position the starter motor of the diesel engine is activated and the diesel engine starts.After starting, the key switch returns to position 1.

3
8
7
1
5
2
6
4

D. 7.5 Driving direction switch (8)

The driving direction switch (8) is fitted above the ignition key switch and has three positions:

- neutral ‘0’
- forward ‘up arrow’
- reverse ‘down arrow’.

WARNING

IT IS ONLY POSSIBLE TO START THE ENGINE IF THE DRIVING DIRECTION SWITCH/PARKING BRAKE SWITCH IS IN THE NEUTRAL (0) POSITION.DURING SWEEPING IT IS POSSIBLE TO ENGAGE REVERSE VIA A FOOT PEDAL.BUT ONLY DO THIS WHEN YOU ARE DRIVING SLOWLY.

7
6
5
4
1
3
2

D. 8 iSystem LED display panel

The iSystem LED display panel (6) is located above the steering column inside the cabin.The controls for the lighting are located on the iSystem LED display panel (6).

D. 8.1 Hazard-lights switch

The flashing lights can be switched to hazard-light operation with the hazard-lights switch (1).All flashing lights, both front and rear, will then flash.

D. 8.2 Light switch

The light switch (2) has three positions:

- off
- parking lights/roadside parking lights
- main beam/driving lights.

NOTE

DIPPED AND MAIN BEAM ARE ONLY SWITCHED ON WHEN THE IGNITION KEY SWITCH IS IN POSITION '1'.

D. 8.3 Beacon light switch

The beacon light switch (3) switches on the beacon lights.

D. 8.4 Rear fog light

The rear fog light switch (4) switches on the rear fog light.

D. 8.5 Mirror heating switch (optional)

This switch (5) activates the mirror heating.

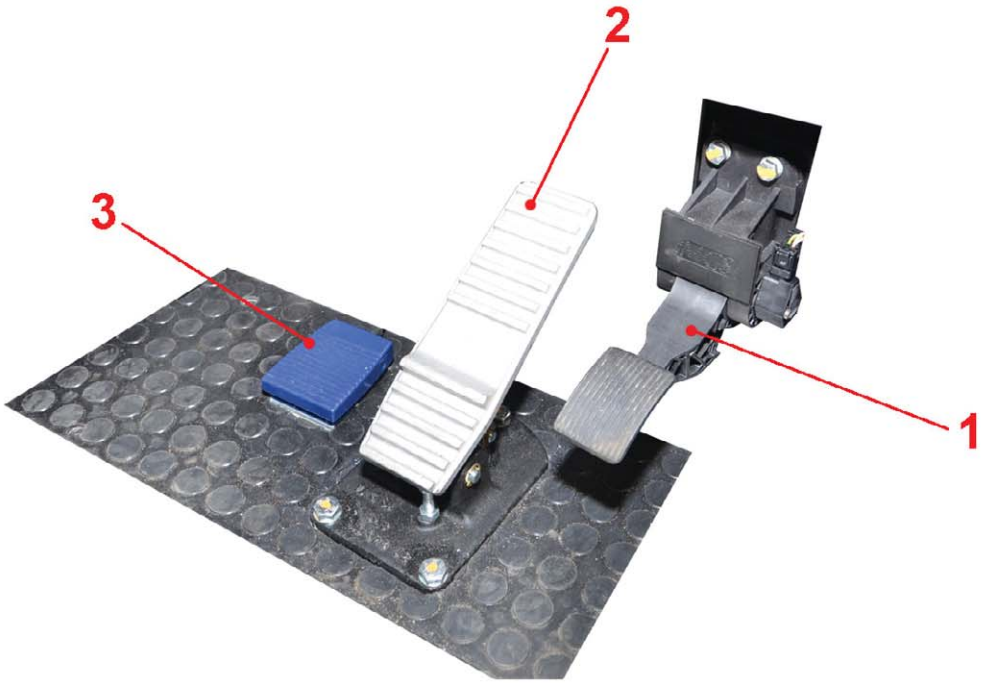
D. 8.6 Headlight height adjustment (ABS)

This button (7) adjusts the position of the headlights to the load in the sweeper.

Turn the knob anti-clockwise to lower the headlight beams and clockwise to raise them.

D. 8.6.1 The knob has four positions:

- 0 = empty
- 1 = lightly loaded
- 2 = moderately loaded
- 3 = full


2
3
1

D. 9 Pedals

The sweeper has two pedals and a foot switch.

D. 9.1 Accelerator pedal

The accelerator pedal (1) allows infinitely variable adjustment of the driving speed.

When the accelerator pedal is released during driving, the hydrostatic brakes engage.

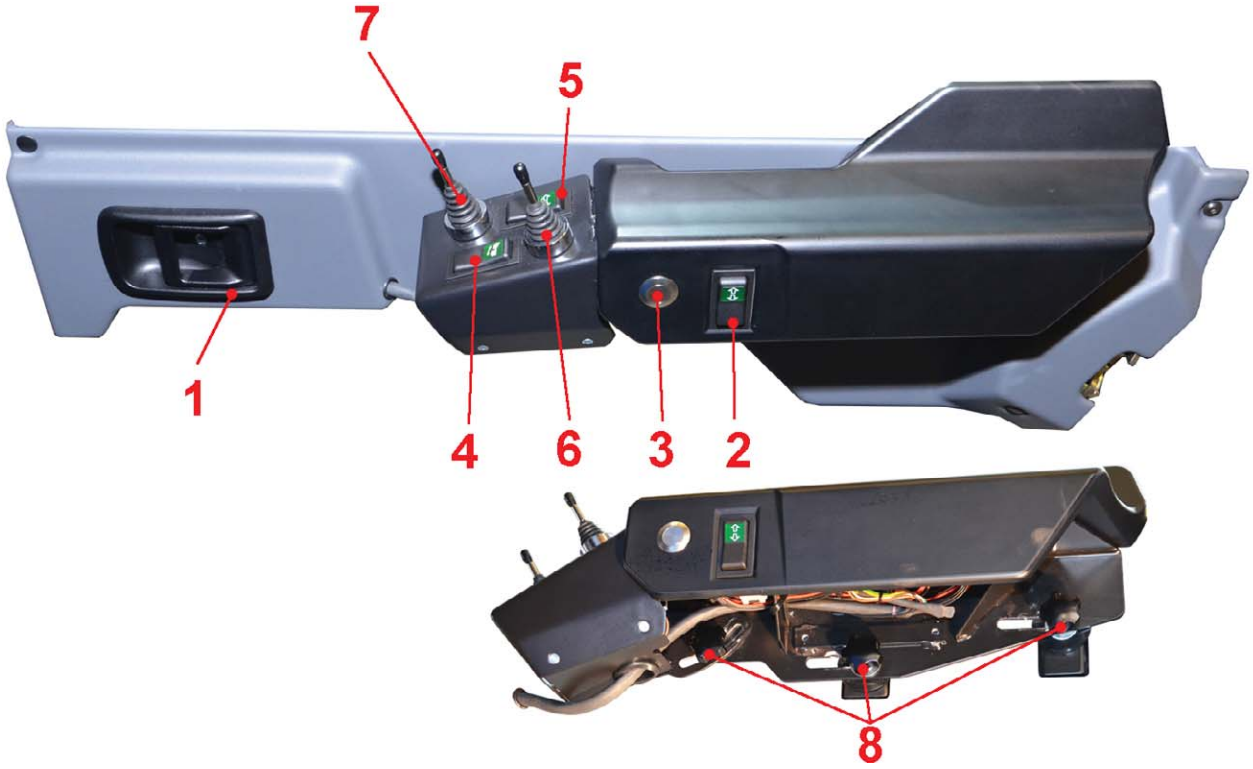
D. 9.2 Brake pedal

The brake pedal (2) operates the brakes on the front and rear axles.

D. 9.3 Foot switch

The sweeper is fitted with a foot switch (3) which allows the reverse to be engaged during sweeping.

⚠
CAUTION
ONLY USE THE FOOTSWITCH DURING SLOW MANOEUVRING.


7
5
1
4
6
3
2
8

D. 10 Door console

The door console is fitted on the right next to the driver's seat against the inside of the door.Joysticks, switches and a push button are fitted into this door console with which the sweeping functions can be operated very simply. The position of the door console can also be adjusted.This can be done using three adjustment buttons on the underside of the door console.

In order to be able to operate the joysticks, switches and the push button on the door console, the Dump/Drive/Sweep switch on the dashboard must be set to Sweep.

D. 10.1 Door handle

This handle (1) is used to open the door from the cabin.

D. 10.2 Switch

Using this switch (2), it is possible to move the suction nozzle flap hydraulically up and down.In the centre position, the suction nozzle flap remains in the selected position.The driver can see the movement of the suction nozzle flap via the front screen.

The conditions here are that the Dump/Drive/Sweep switch on the dashboard is set to Sweep.

D. 10.3 Third brush button (option)

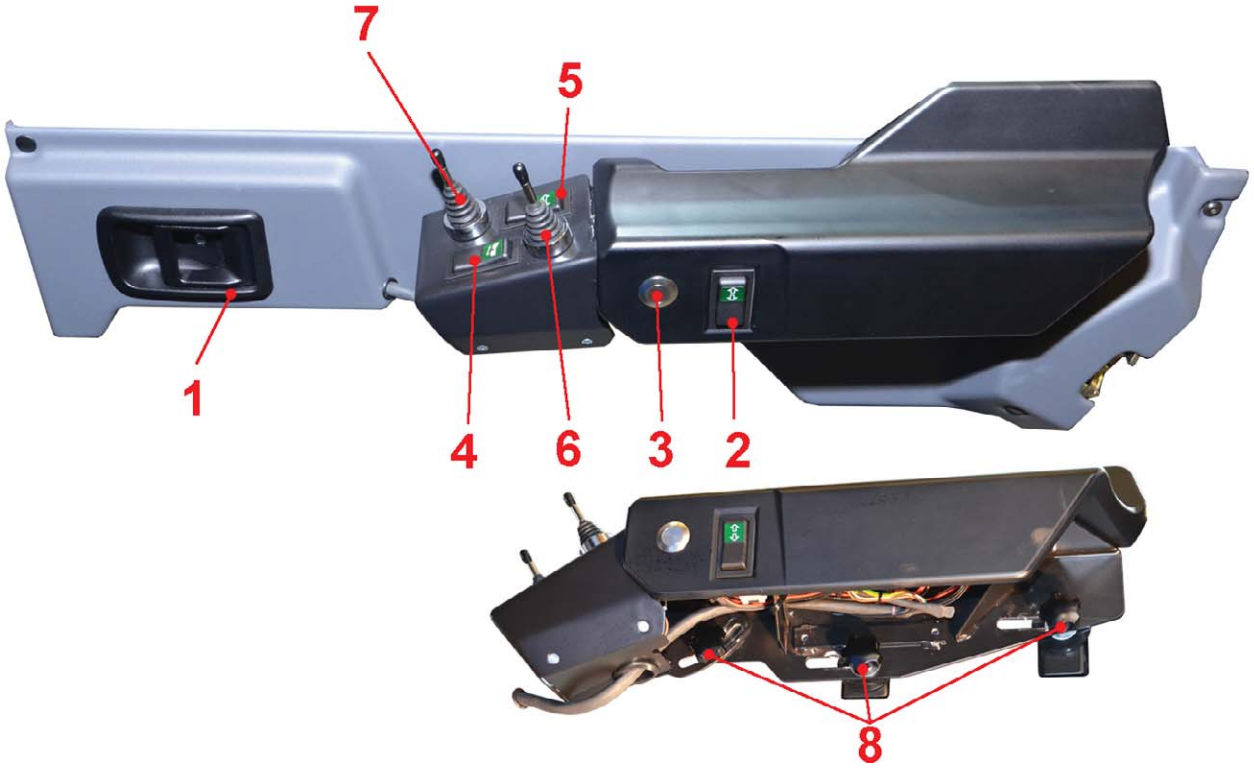
The third brush can be stowed away or put in operation more quickly using the push button (3) in the armrest.By pressing the button (3) once, the third brush will automatically retract.If button (3) is pressed again during the retraction cycle, the retraction process will stop.If the button (3) is pressed again, then the third brush will return to its former position.

D. 10.4 Gutter brush angle adjustment switch (option)

The angle of the right gutter brush can be set with switch (4) in the armrest.If the left brush angle adjustment option is also present, the left brush angle can also be adjusted with this switch after selection of this option on the dashboard.

D. 10.5 Switch, third brush (option)

The third brush arm can be raised and lowered with switch (5) in the armrest.


7
5
1
4
6
3
2
8

D. 10.6 Joystick

The joystick (6) has various functions:

D. 10.6.1 Lifting:

By moving the joystick (6) upwards, the brushes and the suction nozzle will be raised, the brush motors will be turned off and the supply of spraywater to the brushes and the suction nozzle will be stopped.

If the sweeper fan, the spraywater pump and the suction nozzle sprayers are switched on, they remain active.

D. 10.6.2 Lowering:

By moving the joystick (6) downwards, the brushes and the suction nozzle will be lowered and the brush motors and the supply of spraywater to the brushes will be switched on.

However, this is on condition that the brush switch and the spraywater pump switch are switched on.

D. 10.6.3 Slide left/right:

By moving the joystick (6) to the left or to the right the entire sweeping unit will be moved to the left or to the right over a total distance of 450 mm.The brushes can be moved while they are rotating.

Before the brushes and suction nozzle are raised, it is recommended that the sweeping unit be slid to the middle position.

D. 10.7 Joystick, third brush (option)

The third brush can be swivelled and slid with the joystick (7) in the door console.

D. 10.8 Door console adjustment

The position of the door console can be adjusted with the three adjustment buttons (8).

1
2
3
4
5

D. 11 Heating and Air Conditioning

The sweeper is equipped with a user-friendly, easily adjustable heating and air conditioning system.

The heating and air conditioning system has the following control options:

D. 11.1 Air conditioning knob

The air conditioning is turned on with the knob (1).

D. 11.2 Recirculation knob

Under certain conditions (dusty, cold) it may be desirable not to draw in all the air from the outside.Knob (2) is used to set the system to partial recirculation.At a low outside temperature, the recirculation mode also helps to quickly bring the cabin to the desired temperature.

D. 11.3 Airflow selection knob

The airflow selection knob (3) directs the airflow from the heating and air conditioning system towards the windscreen, floor or directly into the cabin.The openings at the sides can be rotated to direct the airflow however you choose.It is also possible to open and close them individually.

D. 11.4 Temperature knob

Knob (4) is used to control the temperature of the heating and air conditioning system.This knob is used to set the temperature as follows:

- completely anti-clockwise, heater/air conditioning at maximum hot temperature
- completely anti-clockwise, heater/air conditioning at maximum cold temperature
- desired temperature is infinitely adjustable.

D. 11.5 Heater fan knob

The heater fan is switched on by the heater fan switch (5).

This switch has four positions:

- Off
- low
- normal
- high.

NOTE

TO LIMIT THE AMOUNT OF REFRIGERANT THAT LEAKS DUE TO HARDENING OF THE SEALS (WHICH IS HARMFUL TO THE ENVIRONMENT) AS MUCH AS POSSIBLE, IT IS RECOMMENDED THAT THE AIR CONDITIONING SYSTEM BE OPERATED REGULARLY.

1
2

D. 12 Radio and interior lighting

The sweeper is equipped with a radio/CD player and interior lighting.These are located above the windscreen.

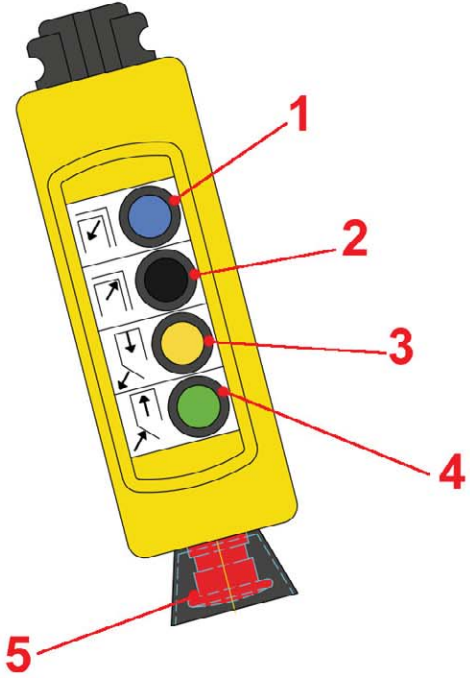
D. 12.1 Radio (1)

See the instruction manual for the radio/CD player for the operation of the radio/CD player.

D. 12.2 Interior lighting (2)

The interior lighting (2) can be switched on and off by pressing the interior lighting.

When one of the cabin doors is opened, the lighting will always go on and stay on; the lighting will go out when the door is closed.


1
2
3
4
5

D. 13 Container remote control ST and CD

The sweeper is equipped standard with a remote control to operate the container during Dumping.This is located in the cabin on the driver's side.

D. 13.1 Raise container button

Container is raised hydraulically (1)

D. 13.2 Lower container button

Container is lowered hydraulically (2)

D. 13.3 Open container door/extend pusher button

The container door is hydraulically opened and the pusher is hydraulically extended (3).

D. 13.4 Close container door/retract pusher button

The pusher is hydraulically retracted and the container door is hydraulically closed (4).

D. 13.5 Container emergency stop button

Buttons 1 to 4 on the remote control are disabled (5).

NOTE

THE CONTAINER REMOTE CONTROL ONLY WORKS WHEN THE DUMP/DRIVE/SWEEP SWITCH ON THE DASHBOARD IS SET TO DUMP.

D. 13.6 Container emergency stop reset

- Turn the emergency stop (5) clockwise.The emergency stop will now be reset
- Set the Dump/Drive/Sweep switch on the dashboard to Drive.All sweeper functions can now be operated again.

6
5
1
2
3
4

D. 14 Driver's seat

A number of adjustments can be made to the driver's seat.

WARNING
NEVER ADJUST THE SEAT WHILST DRIVING THE SWEEPER!

D. 14.1 Adjusting the angle of the back of the seat

The button (1) can be used to adjust the angle of the back of the chair.

D. 14.2 Springs

The seat can be made harder/fermer by rotating the button (2) anticlockwise or softer by rotating the button (2) clockwise.

D. 14.3 Distance to the steering wheel and the pedals

The handle (3) at the front of the seat can be used to adjust the distance to the steering wheel and the pedals.

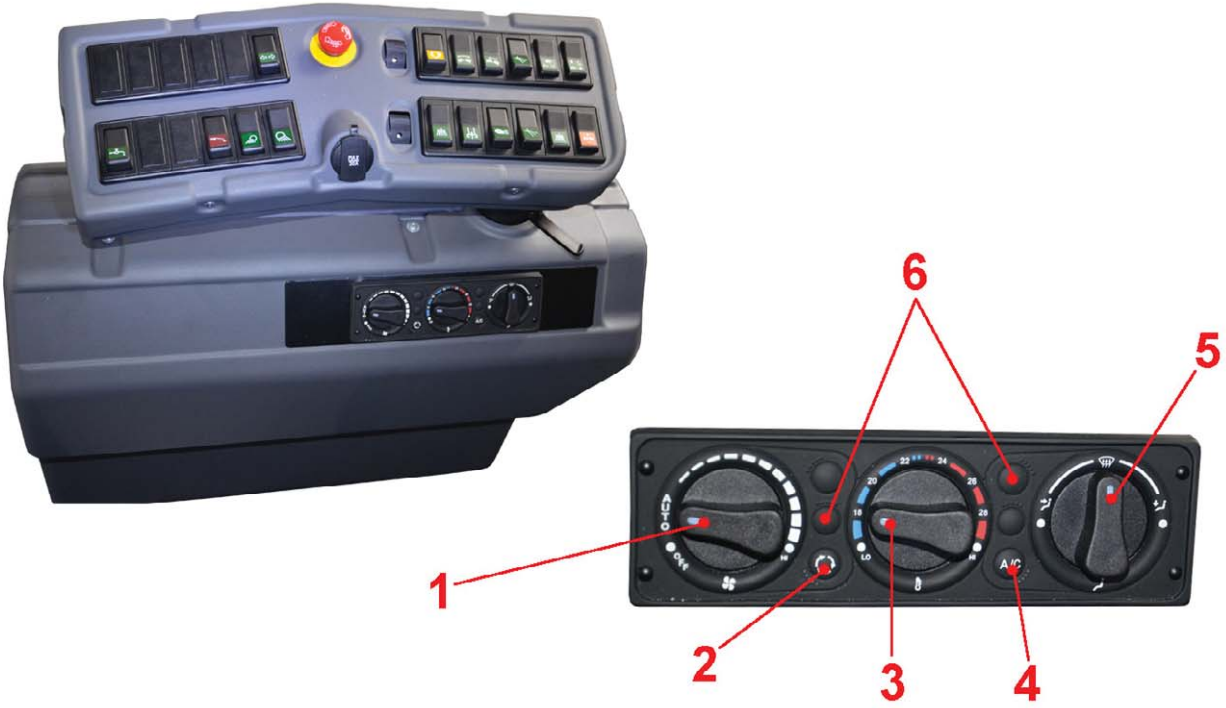
D. 14.4 Height of the seat

The button (4) can be used to adjust the height of the front or the rear of the seat.

- Pushing the button downwards moves the front of the seat upwards or downwards.
- Pulling the button upwards moves the rear of the seat upwards or downwards.

D. 14.5 Adjusting the lumbar support of the chair

The button (5) can be used to adjust the lumbar support of the chair.


6
5
1
2
3
4

D. 15 Climate control unit (option)

The sweeper can be optionally equipped with a user-friendly, easily adjustable climate control unit.The climate control unit is operated as follows:

D. 15.1 Fan speed control

This fan speed control (1) allows continuously variable adjustment of the fan speed.The knob has the following positions:

D. 15.1.1 OFF mode

In the OFF position, the control unit performs the following functions:

- AC compressor off
- Fan speed zero
- Water valve fully closed

D. 15.1.2 AUTO mode

In AUTO mode, the fan speed is based on the selected temperature, the temperature in the cabin and the outside temperature.

D. 15.1.3 MANUAL mode

In manual mode, the fan speed is based on the position of the knob (1).

D. 15.2 Recirculation button

Under certain conditions (dusty, cold) it may be desirable not to draw in all the air from the outside.Knob (2) is used to set the system to recirculation mode.At a low outside temperature, the recirculation mode also helps to quickly bring the cabin to the desired temperature.

D. 15.3 Temperature controller

This controller (3) allows you to set the temperature.With this controller the temperature is set as follows:

- Control fully anti-clockwise, temperature colder
- Control fully clockwise, temperature warmer

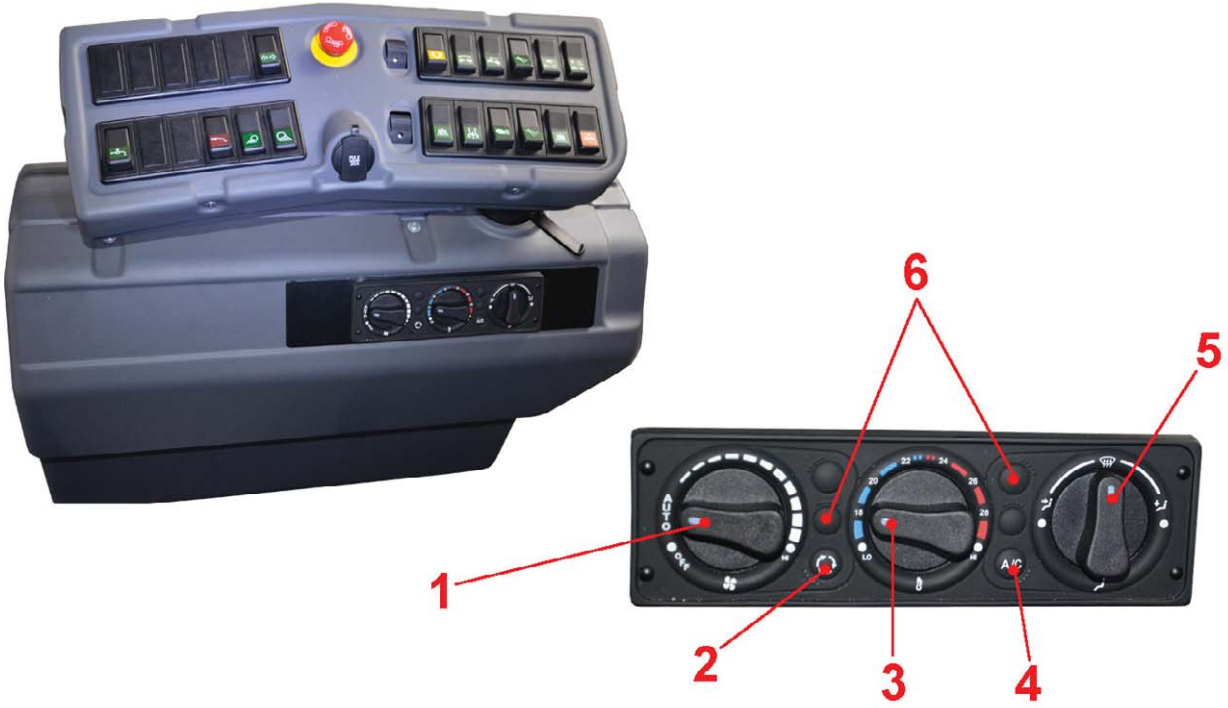
When the control is set to LO, the air conditioning compressor will be engaged when the fan speed control is set to AUTO.

When the control is set to HI, the air conditioning compressor will be disengaged when the fan speed regulator is set to AUTO.

When the HI or LO setting is deselected, the climate control unit will return to its original setting.

NOTE

TO LIMIT THE AMOUNT OF REFRIGERANT THAT LEAKS DUE TO HARDENING OF THE SEALS (WHICH IS HARMFUL TO THE ENVIRONMENT) AS MUCH AS POSSIBLE, IT IS RECOMMENDED THAT THE AIR CONDITIONING SYSTEM BE OPERATED REGULARLY.


6
5
1
2
3
4

D. 15.4 Air conditioning button

Button (4) switches the AC compressor on or off.

D. 15.5 Airflow selection knob

The airflow selection knob (5) directs the airflow from the climate control unit towards the windscreen, floor or directly into the cabin.The openings at the sides can be rotated to direct the airflow however you choose.It is also possible to open and close them individually.

D. 15.6 Defrost/demist function

The climate control unit features a defrost function that can be activated by pressing both buttons (6).This will quickly defrost/demist the windscreen.The defrost function can only be activated when the fan speed control (1) is not in the OFF position and the air flow selection knob (5) is not in the windscreen position.

The defrost function can be deactivated by pressing both buttons (6) again.

1
2

D. 16 Parking brake

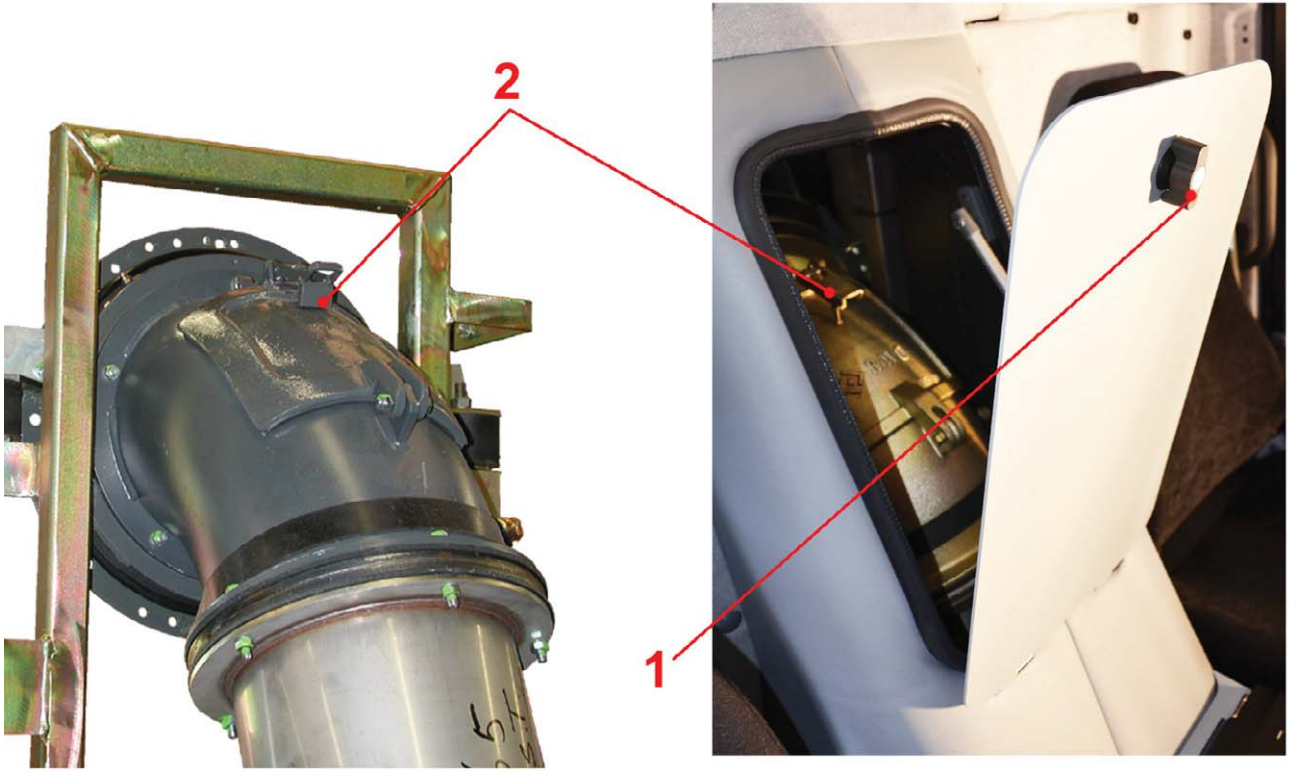
The sweeper is equipped with a parking brake system, which works on rear wheels.The parking brake can be operated with the parking brake handle (2).This handle is mounted on the suction tube tunnel in the cabin.The parking brake is operated as follows:

D. 16.1 Disengaging the parking brake

- Start the sweeper's engine
- Press the parking brake handle (2) forwards/downwards (make sure the pawl (1) falls into its slot)
- The parking brake is disengaged.

D. 16.2 Engaging the parking brake

- Release the pawl (1) from its slot (hold the pawl in this position until the handle (2) has been pulled backwards/upwards)
- Pull the parking brake lever (2) backwards/upwards
- The parking brake is engaged.


2
1

D. 17 Suction tube inspection hatch

The sweeper is equipped with a suction tube inspection hatch.The inspection hatch is mounted on the suction tube tunnel in the cabin.The function of this hatch is to allow removal of any debris that gets stuck in the suction tube and inspection of the suction tube nozzles.The inspection hatch is operated as follows:

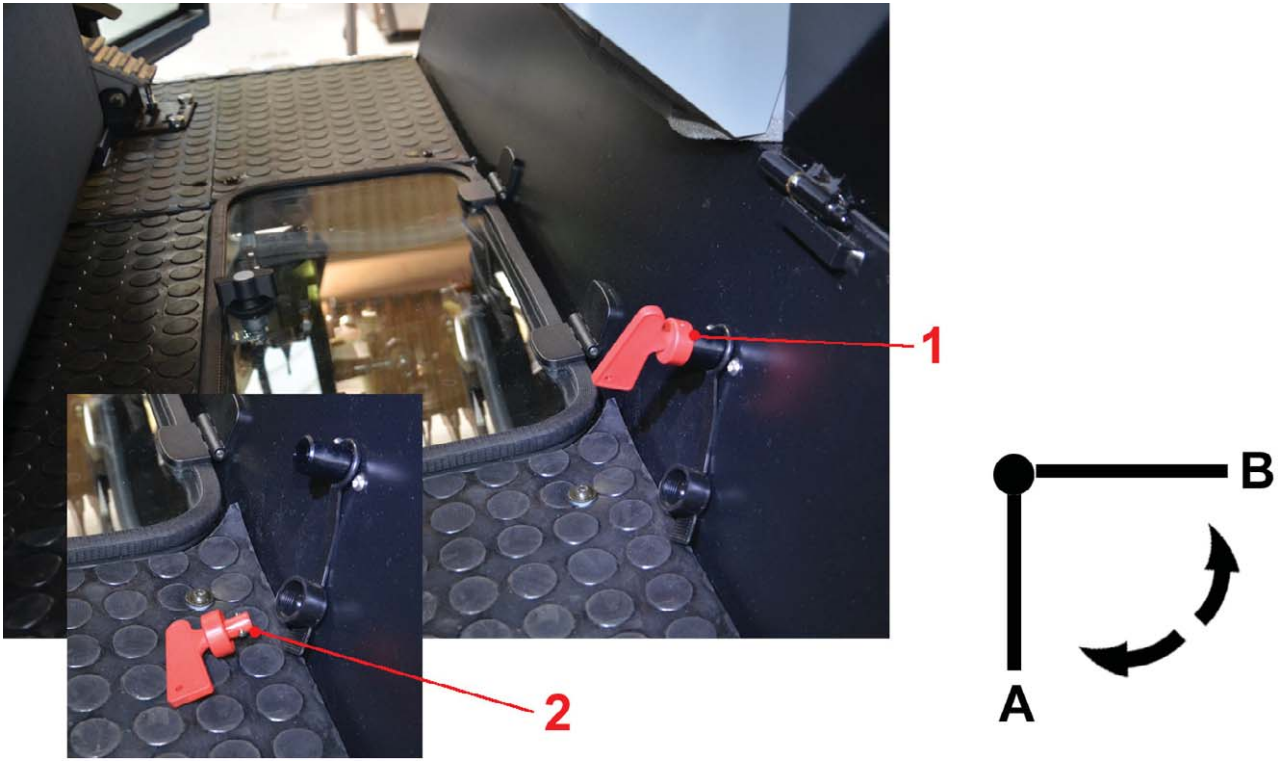
D. 17.1 Suction tube tunnel inspection hatch

- Unlock the suction tube tunnel inspection hatch with knob (1)
- Pull the inspection hatch down.

D. 17.2 Suction tube inspection hatch

- Release the pawl (2) from its latch
- Open the inspection hatch.

⚠
WARNING!
NEVER OPEN THE SUCTION TUBE INSPECTION HATCH WITH THE SUCTION FAN IN OPERATING MODE.


1
2
B
A

D. 18 Positive battery terminal switch

The sweeper is equipped with a positive battery terminal switch (1).This is mounted under the passenger's seat in the cabin.The function of this positive battery terminal switch is to isolate the positive terminal of the battery from the system.

Switch off the positive battery terminal switch every time after use of the machine.

The positive battery terminal switch is operated as follows:

D. 18.1 Switching off the positive battery terminal switch

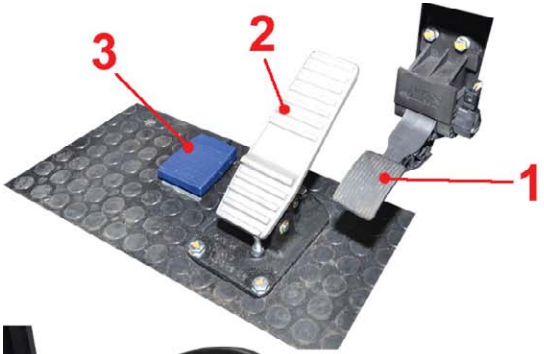
- Disconnect the handle (2) by turning it a quarter turn anti-clockwise, from position (A) to position (B)
- Remove the handle (2) from the positive battery terminal switch (1).

D. 18.2 Switching on the positive battery terminal switch

- Push the handle (2) into the positive battery terminal switch (1) as shown, in position (B).
- Turn the handle (2) in the positive battery terminal switch (1) a quarter turn clockwise from position (B) to position (A).

⚠
NOTE!
FOR EURO 5/6 SWEEPERS, IT IS VERY IMPORTANT TO WAIT AT LEAST THREE MINUTES AFTER THE SWEEPER'S ENGINE HAS BEEN STOPPED BEFORE TURNING OFF THE POSITIVE BATTERY TERMINAL SWITCH.THIS WILL ALLOW THE ADBLUE PUMP TO PUMP THE SYSTEM EMPTY.

E. STARTING AND DRIVING


3
2
1

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8

5
4
10
1000
40
16:00

7
9

E. 1 Starting the Engine

The daily inspection points must be checked before starting.If no abnormalities are found while checking the daily inspection points, the engine can be started.

E. 1.1 Starting:

- The driving direction switch (6) must be in the neutral position
- The parking brake (9) must be engaged
- Turn the ignition key (8) to position ‘1’ and wait until the indicator lights go out
- Start the engine by briefly turning the ignition key (8) to position ‘2’
- Pull away slowly after starting the engine
- Only apply a heavy load to the engine once it has reached the operating temperature.

CAUTION:
DO NOT USE A BATTERY JUMP STARTER TO START THE SWEEPER.THIS MAY DAMAGE THE SWEEPER'S ELECTRICAL SYSTEM.

CAUTION
IF THE WARNING SIGNAL AND INDICATOR LIGHTS (4) AND (5) DO NOT GO OUT WITHIN 7 SECONDS, STOP THE ENGINE IMMEDIATELY AND HAVE THE SWEEPER CHECKED BY A MECHANIC WHO IS FAMILIAR WITH THE MACHINE.

E. 2 Drive

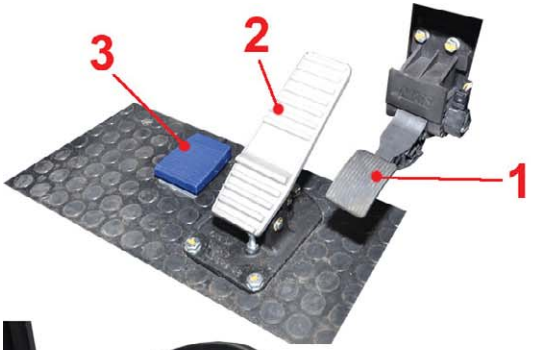
Check all the indicator lights and gauges on the instrument panel and driver's dashboard.If no abnormalities were found, you may drive off.

- If necessary, activate the desired lighting and/or beacon lights
- Switch the driving direction switch (6) to the desired driving direction

CAUTION
IF THE FOOT SWITCH (3) IS ACTIVATED DURING SWEEPING OPERATION, THE DRIVING DIRECTION IS SWITCHED TO REVERSE.ONLY ACTIVATE IF THIS IS DESIRABLE.

- Disengage the parking brake with the handle (9)
- Depress the pedal (1) gradually.The sweeper begins to move.The farther the accelerator pedal is depressed, the faster the sweeper will travel.

CAUTION
IF THE PEDAL (1) IS RELEASED, THE HYDROSTATIC BRAKE IS IMMEDIATELY ENGAGED.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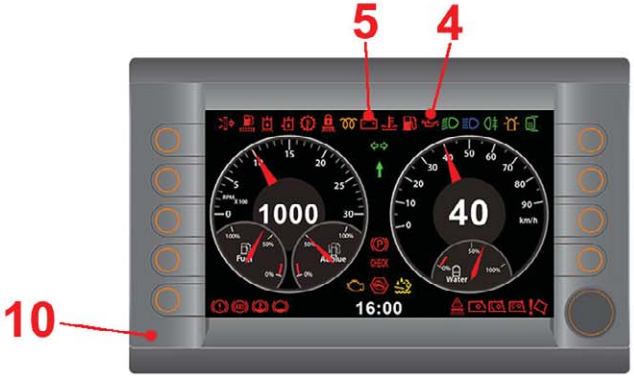
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40
16:00

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8

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E. 3 Brake

The sweeper has three separate brake systems, which operate as follows:

CAUTION
BRAKE GENTLY ON SLIPPERY OR WET ROADS TO REDUCE THE RISK OF SKIDDING.

E. 3.1 Hydraulic brakes

When the accelerator pedal (1) is released (slowly), the sweeper's rear brakes are applied

E. 3.2 Footbrake

When the accelerator pedal (1) is released and the footbrake pedal (2) is depressed, the sweeper's hydrostatic brakes are applied at the rear wheels and the front wheels

E. 3.3 Emergency brake/parking brake

If one of the systems should fail due to a technical defect, the parking brake (9) can be used as an emergency brake.(This can also be disengaged again with the handle.)

CAUTION
NEVER TURN OFF THE ENGINE IMMEDIATELY AFTER SWEEPING OR DRIVING.ALLOW THE ENGINE TO IDLE FOR AT LEAST ONE MINUTE BEFORE TURNING OFF THE ENGINE.

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E. 4 Sweeping

WARNING
ALWAYS TAKE ACCOUNT OF THE OTHER TRAFFIC WHEN USING THE SWEEPER.WHEN CARRYING OUT WORK WITH THE SWEEPER, ALWAYS DEPLOY THE ASSOCIATED WARNING SIGNALS.

Check whether the sweep unit is properly adjusted (see Adjusting the brush unit).

If the sweep unit is properly adjusted you can start sweeping:

- Bring the sweeper to a standstill with the engine turning
- Set the Dump/Drive/Sweep switch (4) to Sweep.The sweeping screen will now be active on the iSystem LED display.
- Switch the suction ventilator on using the suction ventilator switch (8)
- Set the spraywater pump switch (7) to position 2.The sprayers in the suction nozzle are also switched on as a result
- Set the brush switch (6) to position 2.The brush sprayers are also switched on as a result

NOTE
IN WET WEATHER THE BRUSH SWITCH (6) CAN ALSO BE SET TO POSITION 1.THIS MEANS THE BRUSH SPRAYERS WILL NOT BE SWITCHED ON.

- Lower the brushes and suction nozzle by moving the joystick (2) downwards.The brushes will start to rotate automatically
- The brushes can be brought to the desired position with the joystick (2) on the door console
- Change the engine speed with the hand accelerator activation button (3), depending on the sweeping conditions.Always make sure that the speed remains in the green area on the sweeping screen (9)
- Change the brush speed with the hand accelerator activation button (5), depending on the sweeping conditions
- You might have to correct the position and pressure of the brushes in connection with the sweeping conditions and adjust the height of the suction nozzle flap with switch (1) on the door console.

E. 5 Stopping sweeping briefly

This method of stopping is used when you want to briefly stop sweeping, e.g. to quickly cross a busy intersection.

E. 5.1 Stopping for a short time:

- Raise the brushes and suction nozzle by moving the joystick (2) backwards.The brushes stop rotating and are returned to the rest position.The suction fan and spraywater pump continue to run.

E. 5.2 Resume:

- Lower the brushes and suction nozzle by moving the joystick (2) forwards.The brushes begin to turn again.

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E. 6 Stopping sweeping for a longer time

This method of stopping is used when you want to interrupt sweeping for longer periods, e.g. to take a break.

E. 6.1 Stop for a longer time:

- Switch the Dump/Drive/Sweep switch (4) on the dashboard panel to the centre position (Drive)The Drive screen will now be active on the iSystem LED display.
- The brushes and suction nozzle will be raised.The brushes will stop
- The sweeper ventilator stops
- The spraywater pump stops.

NOTE
IT IS THEREFORE NOT NECESSARY TO SWITCH OFF ALL THE SWITCHES FOR THE VARIOUS PARTS INDIVIDUALLY.

E. 6.2 Resume:

- If the engine is off, start it
- Set the Dump/Drive/Sweep switch (4) to Sweep.The sweeping screen will now be active on the iSystem LED display.
- Lower the brushes and suction nozzle by moving the joystick (2) downwards.The brushes begin to turn
- Slide the brushes to the desired position with the joystick (2) on the door console.

E. 7 Opening cabin door open while sweeping

The sweeper is equipped with a safety system that stops the brushes as soon as either of the cabin doors is opened.To resume sweeping again after closing the cabin door, the following steps must be taken:

E. 7.1 Resuming sweeping after opening cabin door:

- Switch the Dump/Drive/Sweep switch (4) on the dashboard panel to the centre position (Drive)The driving screen will now be active on the iSystem LED display.
- Switch the Dump/Drive/Sweep switch (4) on the dashboard panel to the Sweep position.The sweeping screen will now be active on the iSystem LED display.
- Move the joystick (2) forwards.The brushes will begin to turn, and you can resume sweeping.

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E. 8 Dumping ST container

WARNING
THE SWEEPER CAN ONLY BE DISCHARGED ON A HORIZONTAL, FLAT, HARD SURFACE.DISCHARGING IS ONLY ALLOWED IN SPECIALLY DESIGNATED PLACES.MAKE SURE THAT NO PERSONS OR OBJECTS ARE SITUATED BEHIND THE REAR FLAP OF THE SWEEPER.TAKE THE REMOTE CONTROL WITH YOU TO THE BACK OF THE MACHINE SO THAT YOU HAVE A GOOD VIEW OF THE BACK SIDE OF THE SWEEPER DURING DISCHARGING.

E. 8.1 Dumping:

- Set the Dump/Drive/Sweep switch (6) to the Dump position
- Apply the parking brake with the handle (8)
- Press the ‘container door open’ button (2) on the remote control.The container door is hydraulically opened
- Press the ‘raise container’ button (4) on the remote control.The container is tipped and hydraulically emptied
- If necessary, clean the container and suction fan on the inside (see cleaning container)
- Press the ‘container down’ button (3) on the remote control.The container is hydraulically lowered
- Clean the seal and the door latches of the rear flap
- Press the ‘container door closed’ button (1) on the remote control.The container door is hydraulically closed
- Set the Dump/Drive/Sweep switch (6) to the centre position.

NOTE
THE EMERGENCY STOP BUTTON (5) DISABLES ALL REMOTE-CONTROL OPERATING BUTTONS.

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E. 9 Dumping CD container

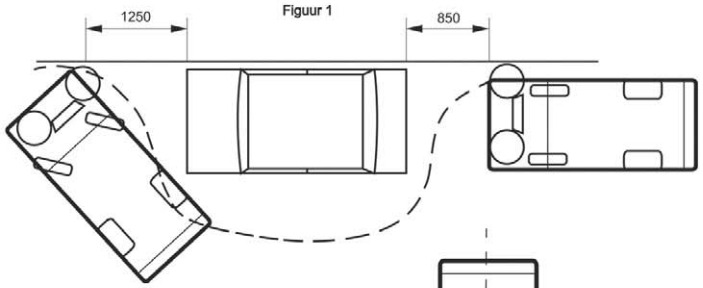
WARNING
THE SWEEPER CAN ONLY BE DISCHARGED ON A HORIZONTAL, FLAT, HARD SURFACE.DISCHARGING IS ONLY ALLOWED IN SPECIALLY DESIGNATED PLACES.MAKE SURE THAT NO PERSONS OR OBJECTS ARE SITUATED BEHIND THE REAR FLAP OF THE SWEEPER.TAKE THE REMOTE CONTROL WITH YOU TO THE BACK OF THE MACHINE SO THAT YOU HAVE A GOOD VIEW OF THE BACK SIDE OF THE SWEEPER DURING DISCHARGING.

E. 9.1 Dumping:

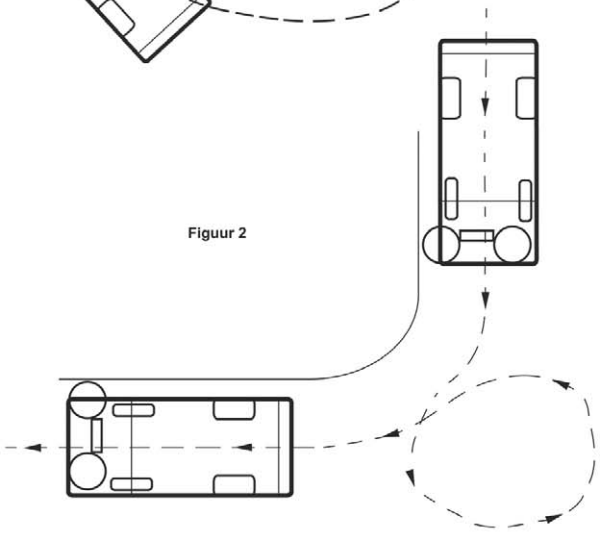
- Set the Dump/Drive/Sweep switch (6) to the Dump position
- Apply the parking brake with the handle (8)
- Press the ‘raise container’ button (1) on the remote control.The container is raised hydraulically
- Press the ‘container door open/pusher out’ button (3) on the remote control.The container door opens and the pusher is hydraulically extended
- Press the ‘container down’ button (2) on the remote control.The container is hydraulically lowered
- If necessary, clean the seal and the door latches of the rear flap, container and suction fan on the inside (see cleaning container)
- Press the ‘container door closed/pusher in’ button (4) on the remote control.The container door closes and the pusher is hydraulically retracted
- Set the Dump/Drive/Sweep switch (6) to the centre position.

NOTE
THE EMERGENCY STOP BUTTON (5) DISABLES ALL REMOTE-CONTROL OPERATING BUTTONS.

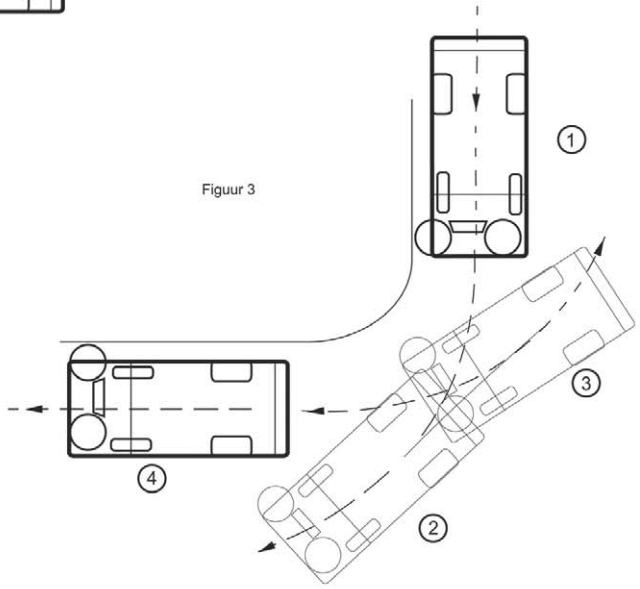
Figuur 1



Figuur 2



Figuur 3



E. 10 Instructions and tips for sweeping

WARNING

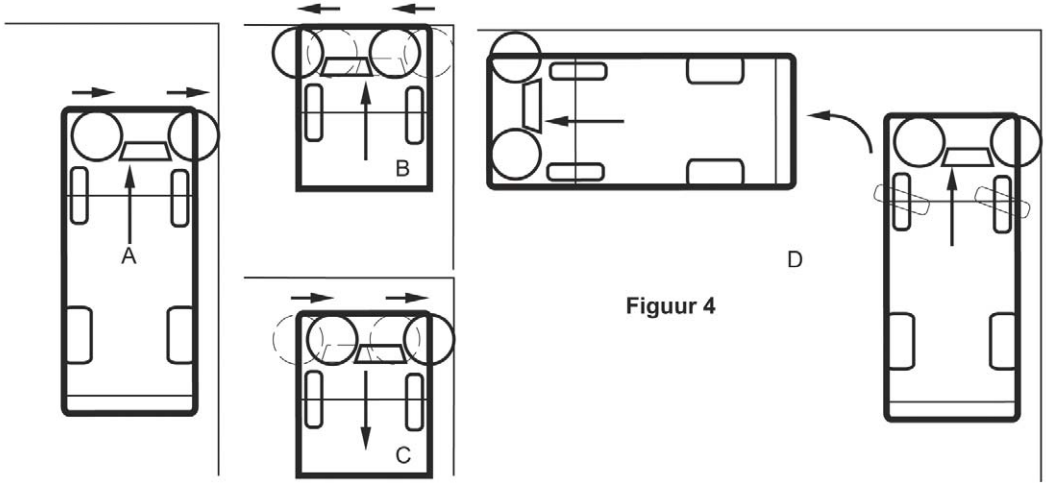
ALWAYS ENSURE THAT CLEAN AND FRESH WATER IS USED DURING SWEEPING OPERATIONS.UNFRESH, BRACKISH WATER MAY CAUSE DAMAGE TO HEALTH.PREVENT BACTERIAL INFECTIONS BY REGULARLY RINSING THE WATER SYSTEM THROUGH WITH CLEAN WATER.

- Always ensure that the sweeping unit is properly adjusted.This helps improve the quality of the sweeping and helps prevent unnecessary wear
- Always sweep using enough spraywater, which has the effect of effectively binding together the dust and dirt particles.Stop sweeping immediately if the spraywater level buzzer is activated, and check the spray water indicator to confirm whether or not the spray water tank is actually empty.If the tank is empty, binding of vacuumed dust will cease and this may cause it to be expelled again by the fan.Furthermore, the water sprayers in the suction nozzle may become clogged, resulting in extra wear of the suction nozzle and suction tube.
- For larger particles of dirt or leaves, open the suction nozzle further.
- Where the road surface is heavily contaminated with heavy dirt (such as sand or stones), it is recommended that the area is swept twice.On the first sweep, keep the suction nozzle flap a little higher.On the second sweep, keep the suction nozzle flap down (normal position), and maintain a higher sweeping speed.Sweeping twice at a higher speed will produce a better result than sweeping once at a lower speed.
- Where the road surface is heavily contaminated with light dirt (such as leaves, scraps of paper), sweeping is most effective with a slightly raised suction nozzle flap.
- A new brush is best fitted on the gutter side (usually the right-hand side).It is on this side where wear is the greatest.If the brush is only half worn, fit it to the left-hand side, and fit a new brush to the right-hand side.
- When sweeping around parked vehicles or other objects, it is important to minimise the unswept length of the gutter.Pass the parked vehicle in a wide sweep (see figure 1).

WARNING

ALWAYS TAKE ACCOUNT OF THE OTHER TRAFFIC WHEN USING THE SWEEPER.WHEN CARRYING OUT WORK WITH THE SWEEPER, ALWAYS DEPLOY THE ASSOCIATED WARNING SIGNALS.

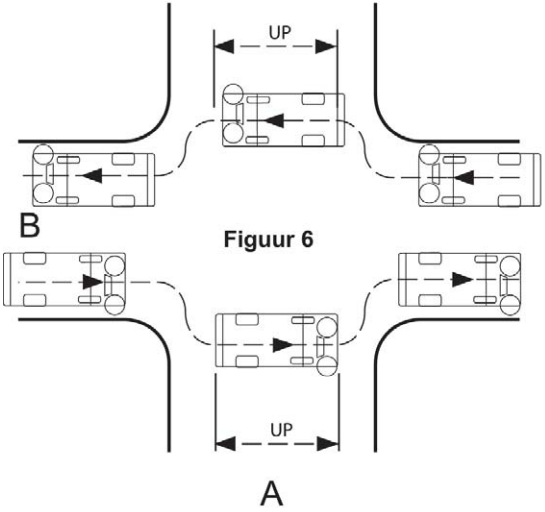
- When sweeping around a right-angled outside corner, the quickest and most straightforward manner is to firstly drive straight ahead a little, make a three-quarter turn and then return to the original direction of travel at a right-angle (see figure 2).
- In heavy traffic, when sweeping a right-angled outside corner, it is better to follow the bend a little, then reverse slightly and sweep forwards following the bend again ("going in twice").(see figure 3)



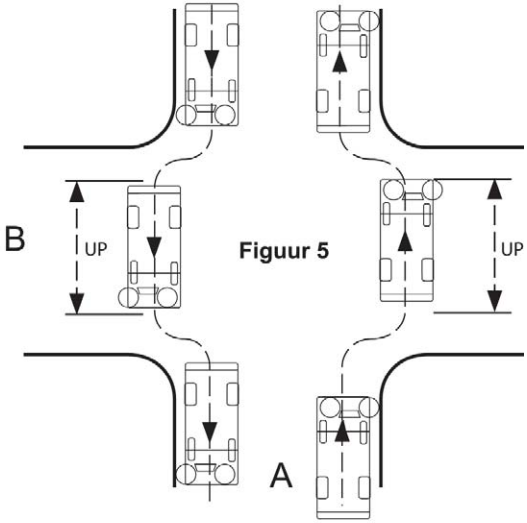
Figuur 4

- When sweeping a right-angled inside corner, the most simple method of sweeping is to move the brush unit into the transverse direction (see figures 4 A to D).
- A. Travel with the sweeper positioned to the right, along the kerb, as far into the corner as possible.
- B. Slide the sweeper completely to the left when at a standstill.
- C. Reverse a short distance, and stop.Slide the sweeper completely to the right.
- D. Drive forwards with the wheels all the way to the left so that the machine reaches the kerb.At the same time, slide the sweeper to the left, and on leaving the corner, slide the sweeper to the right.

E. 10.1 Sweeping a right-angled inner corner.



Figuur 6



Figuur 5

- Cross the junction, whilst doing so sweeping the half of the first corner, raise the brushes and cross (dotted line between the UP arrows) then lower the brushes so that the half of the second corner can be swept.Drive straight ahead and continue sweeping road A.See Figure 5.
- On returning along street A sweep the corners and in the same manner, see Figure 5.Sweep the roads at right angles to street A, in this instance street B, in the same manner; see Figure 6.

NOTE
SWEEPING THE STREETS IN THIS MANNER WILL MINIMISE THE NUMBER OF RIGHT-ANGLED CORNERS TO BE NEGOTIATED!

E. 10.2 Optimum sweeping speed

- Sweep at an optimum speed.1400 RPM is a speed which is frequently used.

WARNING
PROLONGED SWEEPING BELOW THE OPTIMUM SWEEPING SPEED OF 1400 RPM INCREASES THE RISK OF UREA CONTAMINATION IN THE SYSTEM.THIS CAN CAUSE DAMAGE TO THE SYSTEM AND PREVENT IT FROM FULFILLING THE ENVIRONMENTAL REQUIREMENTS.THE OPTIMUM AND RECOMMENDED SWEEPING SPEED IS 1400 RPM.

NOTE
CONSEQUENTLY, THE OPTIMUM SWEEPING SPEED WILL LIE BETWEEN 1300 AND 1700 RPM.THERE IS NO NEED TO SWEEP BELOW OR ABOVE THIS SPEED.DOING SO WILL CONSUME MORE FUEL, INCREASE WEAR, PRODUCE MORE NOISE AND HAVE DETRIMENTAL EFFECT ON THE SWEEPING PERFORMANCE.

NOTE
AN EXACT SPEED FOR EACH TYPE OF DIRT IN DIFFERENT CONDITIONS CANNOT BE SPECIFIED. EXPERIENCE AND SKILFUL USE PLAY AN IMPORTANT ROLE IN THIS.

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E. 11 Sweeping with the third brush (option)

The third brush is a powerful additional brush fitted to the front of the sweeper.The additional brush increases the sweeping range of the sweeper to 3200mm and to 1960mm at the front.As a result, the third brush is ideally suited to sweeping the pavement, trenches, gutters, etc.The third brush is ideally suited to removing weeds.

WARNING
YOU MUST NOT ALLOW ANY PERSONS WITHIN THE RANGE OF THE THIRD BRUSH WHEN THIS THIRD BRUSH IS IN USE.

WARNING
ALWAYS TAKE ACCOUNT OF THE OTHER TRAFFIC WHEN USING THE SWEEPER.WHEN CARRYING OUT WORK WITH THE SWEEPER, ALWAYS DEPLOY THE ASSOCIATED WARNING SIGNALS.

WARNING
THE THIRD BRUSH SHOULD ONLY BE USED ON AN 5-SERIES RAVO ADAPTED FOR THE PURPOSE.INTERCHANGING THIS TO ANOTHER MACHINE IS NOT POSSIBLE.

E. 11.1 Implementation:

- Set the Dump/Drive/Sweep switch (1) to Sweep.The sweeping screen will now be active on the iSystem LED display.
- Set the switch (2) into the position for the required rotation direction (see dashboard description)
- Put the third brush in the required operating position using the joystick (4) in the door console.The third brush can also be pivoted and slid from left to right with the joystick (4).
- The switch (7) in the armrest is used to lower the third brush arm and activate brush rotation.
- Using controller (5), the rotational speed of the third brush can be continuously regulated from zero rpm/min to max.
- The angle of inclination (left/right) of the third brush can be adjusted with switch (9) (option)
- The angle of incidence (forward/backward) of the third brush can be adjusted with switch (8).
- This switch (6) releases the supply of spraywater to the third brush.

E. 11.2 Retraction:

- Switch the third brush off by using the push button in the door console (3).By pressing the button (3) once, the third brush will automatically retract.If button (3) is pressed again during the retraction cycle, the retraction process will stop.If the button (3) is pressed again, then the third brush will return to its former position.The third brush can also be switched off via the switches on the dashboard.The third brush will in both cases complete the standard retraction process.

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E. 12 Opening cabin door while sweeping with third brush

The sweeper is equipped with a safety system that stops sweeping operation as soon as either of the cabin doors is opened.To resume sweeping again after closing the cabin door, the following steps must be taken:

E. 12.1 Resuming sweeping with third brush after opening cabin door:

- Switch the Dump/Drive/Sweep switch (1) on the dashboard panel to the centre position (Drive)The driving screen will now be active on the iSystem LED display.
- Switch the Dump/Drive/Sweep switch (1) on the dashboard panel to the Sweep position.The sweeping screen will now be active on the iSystem LED display.
- Move the switch (7) to the forward position.This will resume sweeping operation.

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E. 13 Third brush rapid replacement system (option)

The third brush option can be fitted with a rapid replacement system making it possible to quickly and easily install and/or uninstall the third brush option onto and off the sweeper.

E. 13.1 Uninstalling the third brush using the rapid replacement system:

WARNING

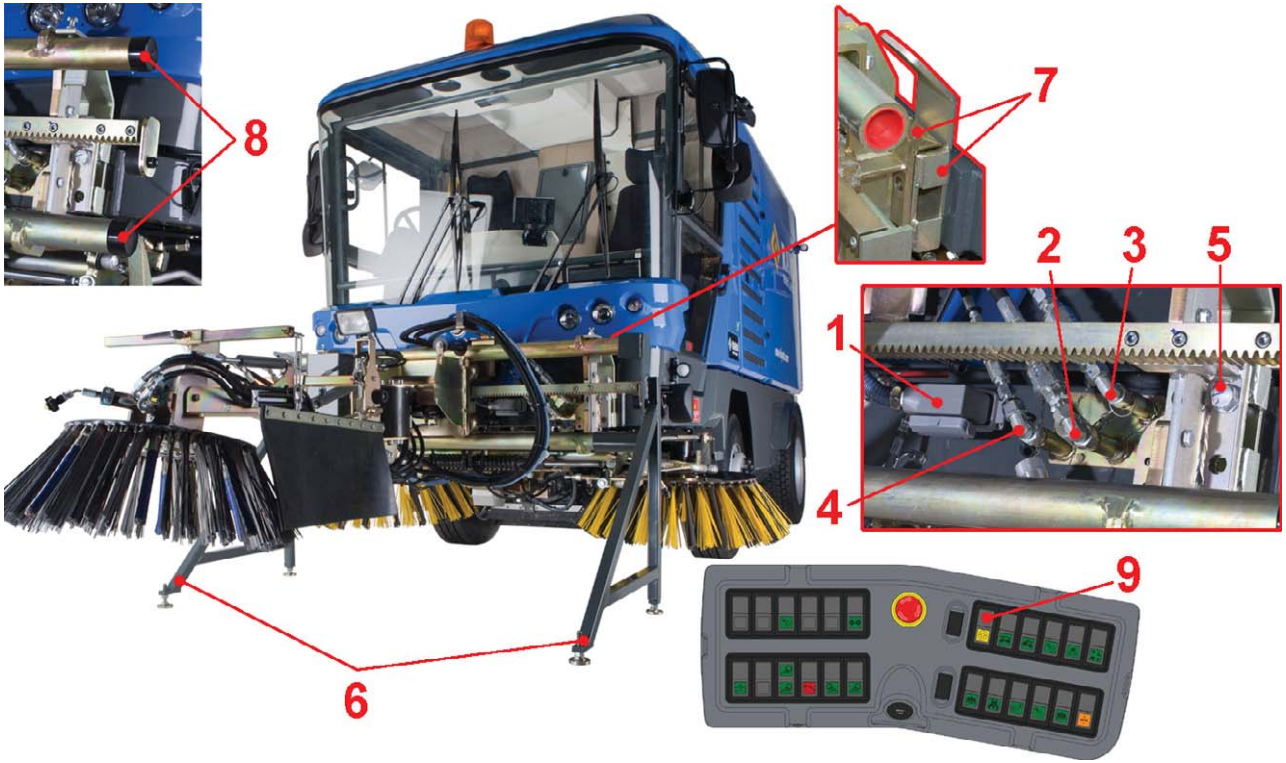
ONLY USE THE THIRD BRUSH RAPID REPLACEMENT SYSTEM ON A PAVED AND FLAT SURFACE. ALWAYS ENSURE THAT THE SYSTEM IS PLACED IN A SAFE POSITION.

- Start the sweeper's engine.
- Position the third brush in the middle of the machine with the brush arm right out to the front.
- Set the front axle suspension to the highest position using the height control switch (9) on the dashboard.
- Stop the sweeper's engine.
- Undo the connector (1) for the third brush system at the front of the machine. Make sure that the connector is not able to get caught in between at any point.
- Undo the hydraulic rapid action couplings (2) and (3) and the water coupling (4) at the front of the sweeper. Make sure that the hoses cannot get caught in between at any point.
- Remove the black cover caps (8) from the frame of the third brush.
- Install the rapid replacement supports (6) at both ends of the third brush. Make sure that the supports are set equally in terms of height and effectively connect to the frame of the third brush.
- Remove the bolts (5) on the left- and right-hand side.

WARNING

THE SWEEPER WILL AUTOMATICALLY ADOPT THE NORMAL DRIVING HEIGHT AFTER BEING STARTED. KEEP YOUR HAND ON THE HEIGHT ADJUSTMENT SWITCH (9) ON THE DASHBOARD WHILST LOWERING.

- Start the sweeper's engine.
- Allow the front axle suspension to lower and carefully drive the sweeper in reverse.
- Install the cover caps on to the hydraulic rapid action couplings (2) and (3) and the cap on the connector (1).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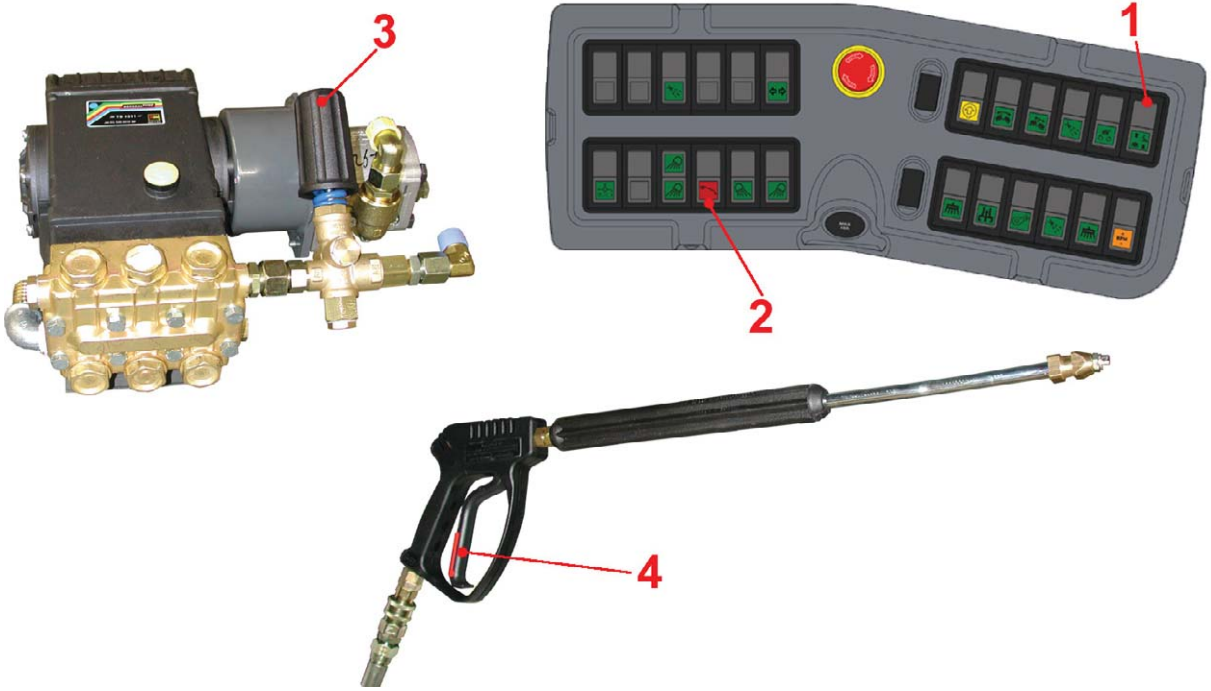
E. 13.2 Installing the third brush using the rapid replacement system:

- Start the sweeper's engine.
- Carefully position the sweeper against the frame of the third brush rapid replacement system. Make sure that the supports (7) on the sweeper and the rapid replacement system are aligned at both ends.
- Carefully set the front axle suspension to the highest position using the height control switch (9) on the dashboard. Make sure that the supports (7) interact well.
- Stop the sweeper's engine.
- Install the bolts (5) on the left- and right-hand side.
- Install the hydraulic rapid action couplings (2) and (3) and the water coupling (4) onto the front of the sweeper.
- Install the connector (1) for the third brush system onto the front of the machine.
- Remove the rapid replacement supports (6) at both ends of the third brush.
- Install the black cover caps (8) onto the frame of the third brush.

WARNING
THE SWEEPER WILL AUTOMATICALLY ADOPT THE NORMAL DRIVING HEIGHT AFTER BEING STARTED. KEEP YOUR HAND ON THE HEIGHT ADJUSTMENT SWITCH (9) ON THE DASHBOARD WHILST LOWERING.

WARNING
YOU MUST NOT ALLOW ANY PERSONS WITHIN RANGE OF THE THIRD BRUSH WHEN THE THIRD BRUSH IS IN USE.

- Start the sweeper's engine.
- Retract the third brush (see sweeping with the third brush)
- Check that the hoses and cables are not dragging and the couplings are not leaking.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1
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E. 14 Working with the high pressure water pump (optional)

E. 14.1 To operate:

- Set the switch Empty / Drive / Sweep (1) to position Empty.
- Switch on the high pressure water pump using switch (2) on the dashboard.
- Unroll the hose with the high pressure spray gun (4) from the automatic hose reel behind the cabin. The high pressure pump is ready for use.

⚠
WARNING
BE CAREFUL WHEN USING THE HIGH PRESSURE JET. DIRECT IT ONLY AT THE SURFACE TO BE CLEANED. WEAR PROTECTIVE CLOTHING SUCH AS GLOVES, RAINSUIT AND A FACE MASK.

E. 14.2 Setting the pressure for the high pressure water pump:

- The water pressure can be set using the black control knob (3) on the high pressure water pump. This does depend on the engine revolutions (idling is more than sufficient).

The pump is fitted with automatic pressure control which limits the water presssure and switches off the pump when the high pressure gun is shut off. Water from the high pressure pump is then led back to the water tank without being under pressure.

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E. 15 Working with the swasher (option)

The Swasher combines the benefits of a sweeper with those of a washer. The spray arm(s) mounted on the roof with the connected spray lance(s) provide maximum freedom for cleaning difficult-to-access places, such as under cars, street furniture and dirty corners. The swasher needs to be operated by two people, the driver and the operator of the spray arms with the spray lance.

E. 15.1 Implementation:

- Open the service door and unlock the swasher spray arm by pulling on the handle for the left side (4) and for the right side (3).
- Set the Empty/Drive/Sweep switch (1) to the Empty position.
- Switch the high-pressure water pump on using the switch (2) on the dashboard.
- Unroll the hose with the spray lance (5) from the self-rolling reel. The swasher is ready for use.

WARNING
EXERCISE CAUTION WHEN USING THE SPRAY LANCE. ONLY AIM TOWARDS THE SURFACE TO BE CLEANED. WEAR PERSONAL PROTECTIVE AND HIGH-VISIBILITY CLOTHING, SUCH AS GLOVES, A RAIN SUIT AND FACE MASK.

WARNING
ALWAYS ENSURE THAT CLEAN AND FRESH WATER IS USED DURING SWEEPING OPERATIONS. UNFRESH, BRACKISH WATER MAY CAUSE DAMAGE TO HEALTH. PREVENT BACTERIAL INFECTIONS BY REGULARLY RINSING THE WATER SYSTEM THROUGH WITH CLEAN WATER.

CAUTION!
ALWAYS TAKE ACCOUNT OF THE OTHER TRAFFIC WHEN USING THE SWEEPER. WHEN CARRYING OUT WORK WITH THE SWEEPER, ALWAYS DEPLOY THE ASSOCIATED WARNING SIGNALS.

E. 15.2 High-pressure water pump pressure settings:

- The water pressure is adjustable using the black adjuster button (6) on the high-pressure water pump, which depends on the engine rpm (stationary is more than sufficient).

The pump is fitted with a pressure control automated system, which limits the water pressure and switches off the pump when the high-pressure gun is switched off. The output from the high-pressure water pump is then discharged to the water tank under normal pressure.

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E. 16 Working with the leaf-suction arm - drain-suction arm (option)

An option, which significantly enhances user options. Implemented using the nozzle attachment, water system and spring-mounted pivoting arm, which is mounted on the container to be (360°) rotational. For emptying and cleaning dustbins, drains and sucking up leaves and dirt in difficult-to-reach places.

E. 16.1 Implementation:

WARNING!
NEVER OPEN THE SUCTION TUBE INSPECTION HATCH WITH THE SUCTION FAN IN OPERATING MODE.

CAUTION!
ALWAYS TAKE ACCOUNT OF THE OTHER TRAFFIC WHEN USING THE SWEEPER. WHEN CARRYING OUT WORK WITH THE SWEEPER, ALWAYS DEPLOY THE ASSOCIATED WARNING SIGNALS.

- Open the suction tube inspection hatch (1) and fit the sealing plate (2) into the suction tube. Close the suction tube inspection hatch (1).
- First remove the belts (6) and take the leaf-suction arm out of its holder.
- Remove the sealing plate from the leaf-suction arm (7).
- Unlock the hook (8) of the leaf-suction arm.
- Ensure that the sweeper hand brake is on.
- Start the sweeper's engine.
- Set the Empty/Drive/Sweep switch (3) to the sweep position.
- Switch on the spray water pump switch (4) to spray water pump position "1".
- Switch on the fan switch (5). The leaf-suction arm can now be used.
- Using the tap (9) on the leaf-suction arm, the water supply to the leaf-suction arm can be switched on and off.

REGENERATION
WATER LEVEL
1
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E. 17 Water recirculation (option)

The water recirculation system is an option, which significantly reduces consumption levels of spray water for road sweeping operations. It also has the effect of reducing dust. As a result, it is possible to sweep for longer before it is necessary to top up with water for the road sweeping operations.

E. 17.1 Implementation:

- Fill the container with 600 litres of water using the container inspection hatch (3). (see the sticker on the container (1) for the fill level).
- Start the sweeper's engine.
- Set the Empty/Drive/Sweep switch (9) on the dashboard to Sweep.
- Switch the suction fan on using the suction fan switch (11).
- Set the spray water pump switch (10) to position 2. The sprayers in the suction nozzle are also switched on as a result.
- Set the brush switch (12) to position 2. The brush sprayers are also switched on as a result.
- Switch the water recirculation system on using the switch (2) on the dashboard.

NOTE

TO PREVENT THE CONTAINER FROM RUNNING DRY WHEN TIPPING UP THE CONTAINER FOR MAINTENANCE WORK, YOU SHOULD ALWAYS FIRST CONNECT THE TAP (8) TO THE CONTAINER DOOR.

NOTE

ALWAYS CLEAN THE WATER RECIRCULATION SYSTEM AFTER USING IT. THIS PREVENTS ANY POTENTIAL BLOCKAGES AND ENSURES OPTIMAL OPERATION OF THE SYSTEM.

E. 17.2 Remove water from the container:

- Set the Empty/Drive/Sweep switch (9) on the dashboard to Empty.
- Switch the water recirculation system on using the switch (2) on the dashboard.

The water will now run out of the container via the pipe system and the suction nozzle. Always ensure that this is done in the intended location.

REGENERATION
WATER LEVEL
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NOTE
ENSURE THAT THE CONTAINER IS EMPTIED BEFORE IT IS POSSIBLE TO START THE CLEANING OPERATIONS.

E. 17.3 Cleaning the filter:

- Set the container door to a small opening and remove the hook (4) and then open the closure (5) on both sides of the filter housing (6).
- The filter housing (6) can now be opened.
- Now open the container door fully.
- Fit the safety support (13)
- Clean the filter housing (6) with sufficient water at low pressure. Do not use a high-pressure sprayer.
- Clean the surfaces of the connectors (7) and (8).
- Check the fine filters in the filter housing for damage, and replace if necessary.

E. 17.4 Rinse through the pipes:

- Open the container door.
- Fit the safety support (13).
- Set the Empty/Drive/Sweep switch (9) to Empty.
- Rinse through the pipe system at low pressure with sufficient water via the opening (7). Do not use a high-pressure sprayer.

FAYAT GROUP
POWER
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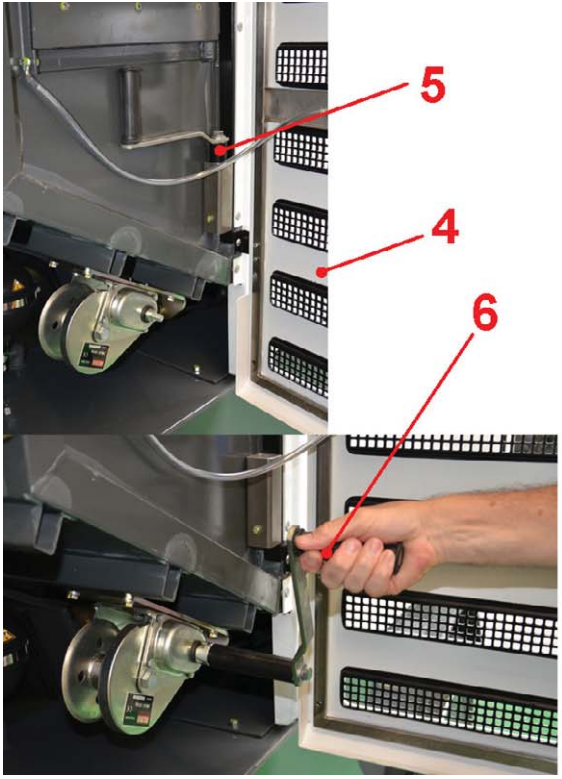
E. 18 Camera system

The RAVO road sweeper is fitted as standard with a rear-view camera. A suction nozzle and/or a side-view camera can be added as an option.

E. 18.1 Camera system functions:

- Light sensor (1).
- Camera on/off button (2). This is used to activate the camera system.
- Scroll up button (3). This button can be used to scroll through the menu.
- Scroll down button (4). This button can be used to scroll through the menu.
- Menu selection button (5). This button can be used to select specific functions from the menu.
- Menu option button (6). This button can be used to retrieve the camera system menu.
- Camera selection button (7). This can be used to switch between the different cameras, if installed.
- 12Volt AV connection (8).

NOTE
PLEASE REFER TO THE CAMERA USER INSTRUCTIONS FOR A DETAILED DESCRIPTION OF ALL MENU FUNCTIONS.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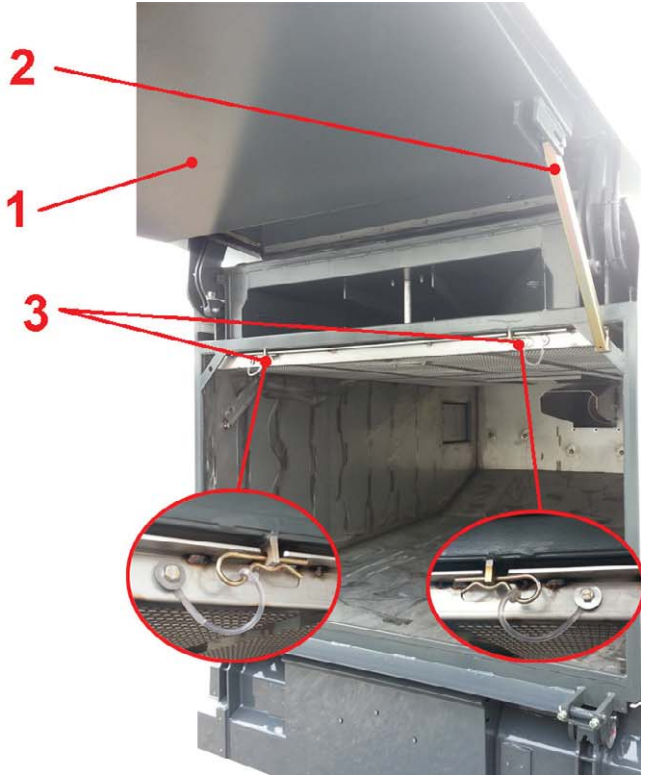
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E. 19 Easy liftable grid

The standard RAVO sweeper is equipped with two grids that must be removed by hand when cleaning the container. An easy liftable grid is available as an optional extra. This simplifies cleaning the container.

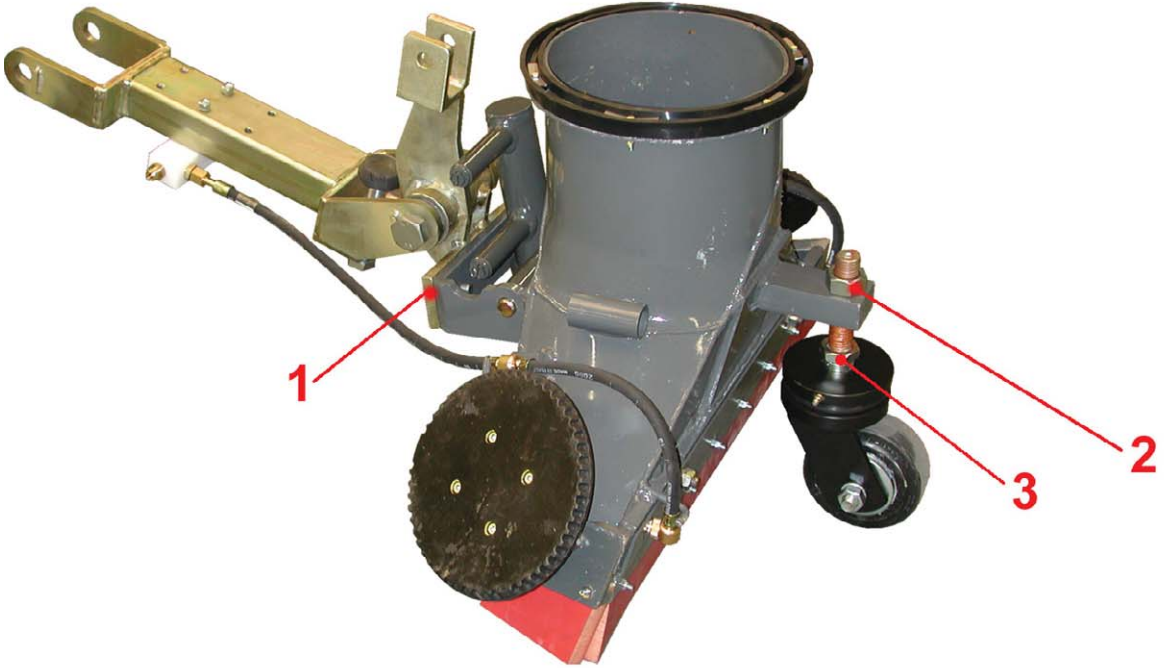
NOTE

MAKE SURE THAT THE CONTAINER IS EMPTY BEFORE YOU BEGIN CLEANING.

E. 19.1 Operation of easy liftable grid:

- Open the container door (1) and fit the safety support (2) (see emptying the ST/CD container for the method used to open the container door)
- Open the left service hatch (4), take the crank out of its holder (5) and mount the crank on the winch (6).
- Remove the two locking pins from the grid (3).
- Turn the winch crank (6) anticlockwise to lower the grid.
- Turn the winch crank (6) clockwise to lift the grid.
- Fit the two locking pins into the grid (3).
- Remove the crank (6) from the winch and put it back in its holder (5).
- Close the left service hatch (4).
- Remove the safety support (2) and close the container door (1).

F. SERVICE/MAINTENANCE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F. 1 Adjustment of sweeper unit suction head

Correct adjustment of the suction-head will have a considerable effect on results. The adjustment of the suction head should be checked on a regular basis. In order to adjust the suction head, the vehicle must be parked on level ground. To position the suction head swivel castor correctly, the vehicle must be moved forward slightly with lowered suction head.

F. 1.1 Suction head levelling

For best results, the underside of the suction head, including the rear section, must be completely level.

Levelling suction head (sideways):
- Loosen the two bolts (1)
- Level the suction head
- Tighten the two bolts (1) securely.

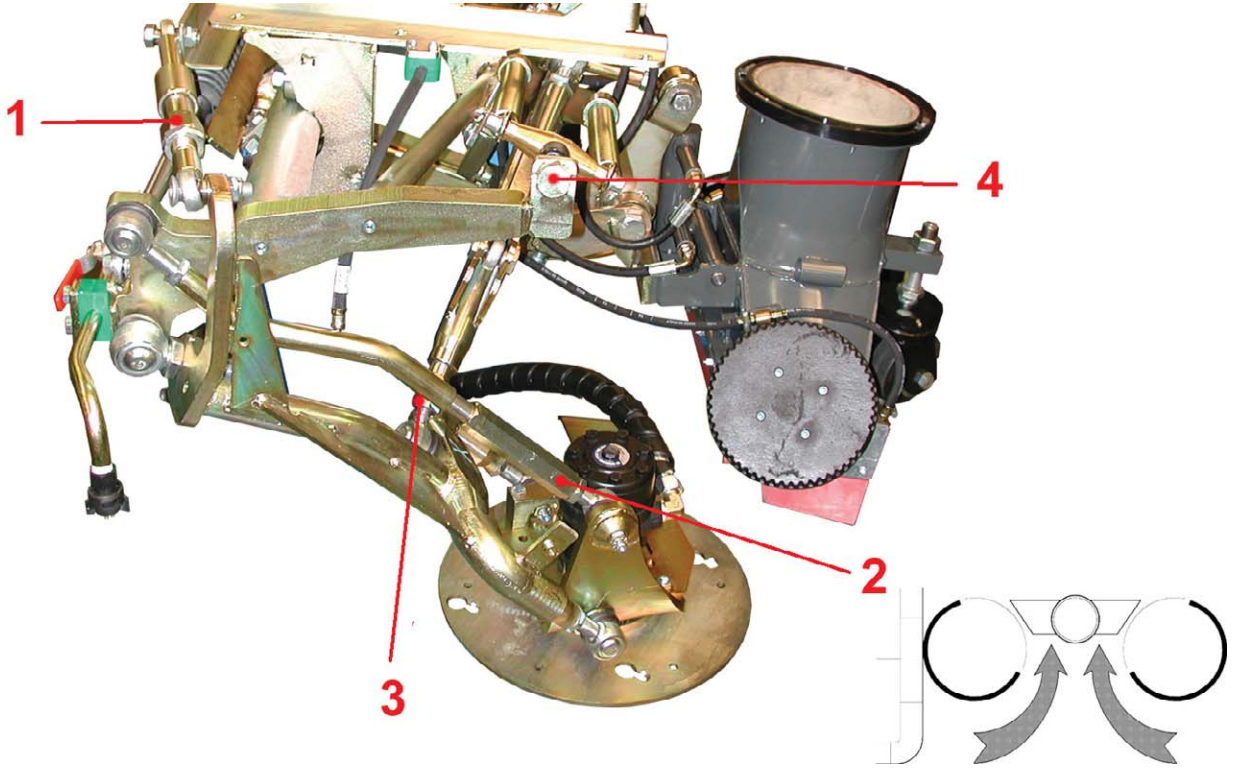
F. 1.2 Road surface clearance

For best results, the underside of the suction head must be set to give a clearance of 10 - 15 mm above the road surface.

Adjusting road clearance:
- Unscrew the lock nut (2).
- Turn swivel castor spindle (3) right or left respectively to raise or lower the suction head.
- Tighten the lock nut (2) securely.

F. 1.3 Suction head rubbers

For best results, it is important that the suction head rubbers fit well and seal off unwanted air. During normal operation, the rubbers wear slowly. Adjust suction head clearance regularly or replace the rubbers.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F. 2 Adjusting the brushes of the sweeper

Four adjustments can be made to the brushes to achieve the ideal and optimal setting for each sweeping situation.

- Brush pressure
- Forward angle of the brushes
- Sideways angle of the brushes
- Distance to the suction nozzle.

NOTE:
PARK THE MACHINE ON A FLAT, FIRM AND UNINTERRUPTED SURFACE.

NOTE:
USE AN SW27 OPEN-ENDED SPANNER AND AN SW30 OPEN-ENDED SPANNER TO ADJUST THE DIRECTION OF THE BRUSH UNIT.

NOTE:
ONLY A ONE-OFF ADJUSTMENT OF THE BRUSH PRESSURE IS REQUIRED.

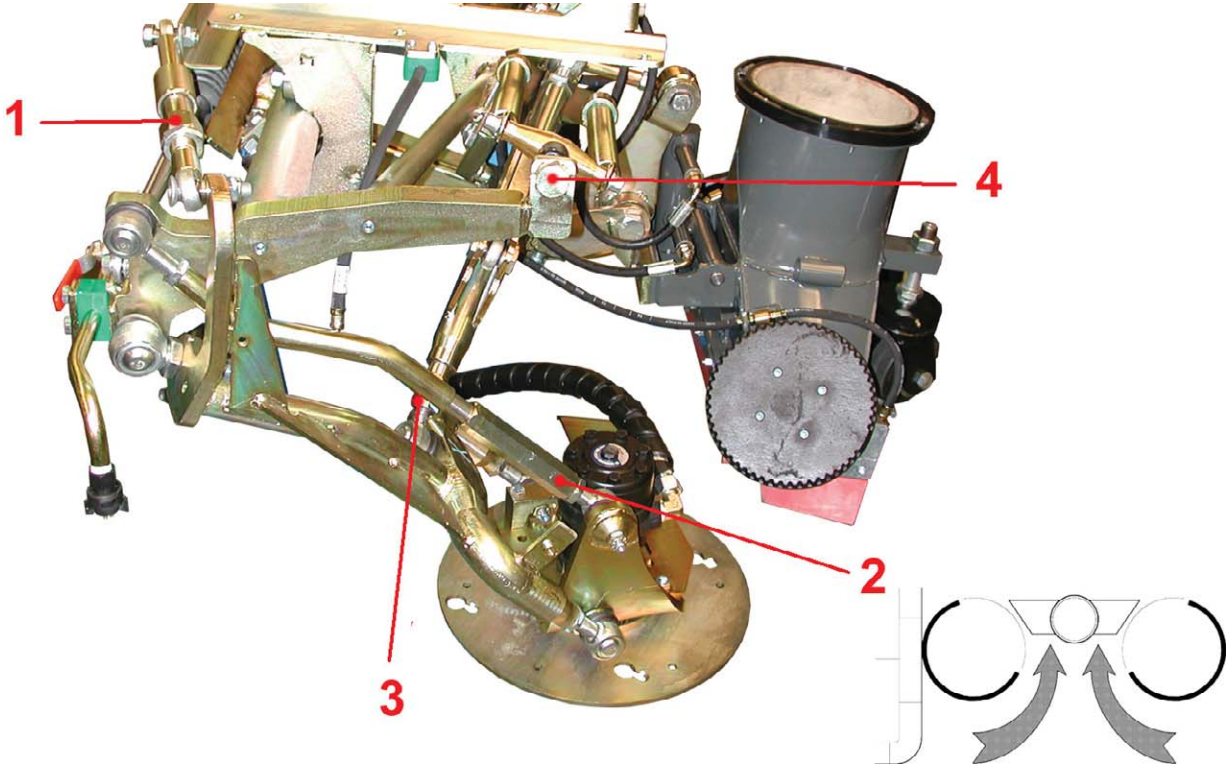
F. 2.1 Brush pressure

The force the brushes exert on the ground is mostly due to their own weight. A relief spring reduces the brush pressure to prevent excessive wear of the brushes. As the brushes slowly wear and become lighter the spring force will decrease proportionally and maintain the brush pressure at a constant level.

F. 2.1.1 Adjusting the brush pressure:

- Turn the adjusting nut (4) clockwise or anticlockwise.
- The brush pressure will then be decreased or increased, respectively.
- First, adjust the pressure to the minimum (the bristles just touch the ground).
- Next, use the adjusting nut (4) to adjust the brush pressure so that the bristles are pushed against the ground and bend outwards by 1 cm.

NOTE:
INCREASING THE BRUSH PRESSURE FURTHER SERVES NO PURPOSE. GREATER BRUSH PRESSURES WILL GREATLY INCREASE THE RATE OF WEAR OF THE BRISTLES, AND WILL NOT IMPROVE THE SWEEPING PERFORMANCE.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NOTE:
A CLEARANCE OF APPROXIMATELY 1 CM BETWEEN THE GROUND AND THE BRISTLES WHEN ADJUSTING THE FORWARDS AND SIDE ANGLES OF THE BRUSHES. THE ADJUSTMENT POINT IS ON THE CENTRE LINE OF THE BRUSH.

F. 2.2 Forward angle of the brushes

The forward angle of the brush (with the rear of the brush slightly raised) must be set to prevent dirt from being thrown around and remaining on the road surface.

F. 2.2.1 Adjusting the forward angle of the brush:

- Unscrew the lock nut at position (2).
- Turn the adjusting nut (2) clockwise or anticlockwise.
- The brush angle will then be decreased or increased, respectively.

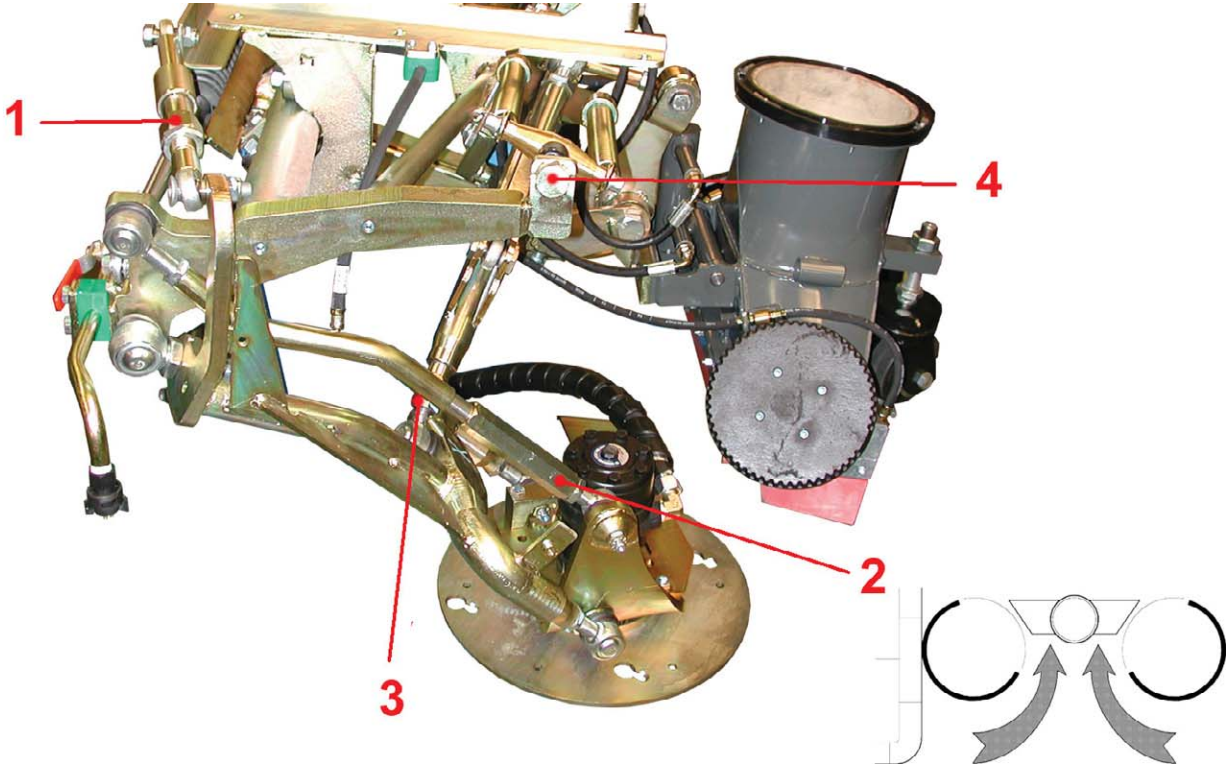
F. 2.3 Sideways angle of the brush

The sideways angle of the brush (with the inside of the brush slightly raised) must be set (the right-hand side may have a hydraulic adjusting mechanism instead of a mechanical mechanism) to enable the brush to follow and clean the road surface and gutter profile in the required manner. Reasonably deep gutters can be cleaned with just a small sideways brush angle.

F. 2.3.1 Adjusting the sideways angle of the brush:

- Unscrew the lock nut at position (1).
- Rotate the adjusting nut (1) on the left-hand side of the brush frame clockwise or anticlockwise.
- The brush angle will then be decreased or increased, respectively.

The brush angle on the right-hand side can be adjusted using a control button on the door console in the cabin.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F. 2.4 Distance to the suction nozzle

The distance between the brushes and the suction nozzle must be correctly adjusted to prevent:

- Excessive wear to the suction nozzle (when the clearance is too small).
- A trail of dirt remaining on the road between the brushes and the suction nozzle (when the clearance is too large).

F. 2.4.1 Adjusting the distance to the suction nozzle:

- Unscrew the lock nut at position (3).
- Turn the adjusting nut (3) clockwise or anticlockwise.
- The length of the coupling shaft will then be decreased or increased, respectively.

⚠
NOTE
WHEN THE SWEEPER IS ADJUSTED CORRECTLY THE BRUSHES WILL LEAVE A PATTERN ON THE ROAD SURFACE AS SHOWN IN THE DIAGRAM ABOVE.

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F. 3 Quickly changing sweeping brushes

The brushes on the sweeping unit are mounted on a quick release plate.Follow these instructions to replace the brushes.

⚠

WARNING

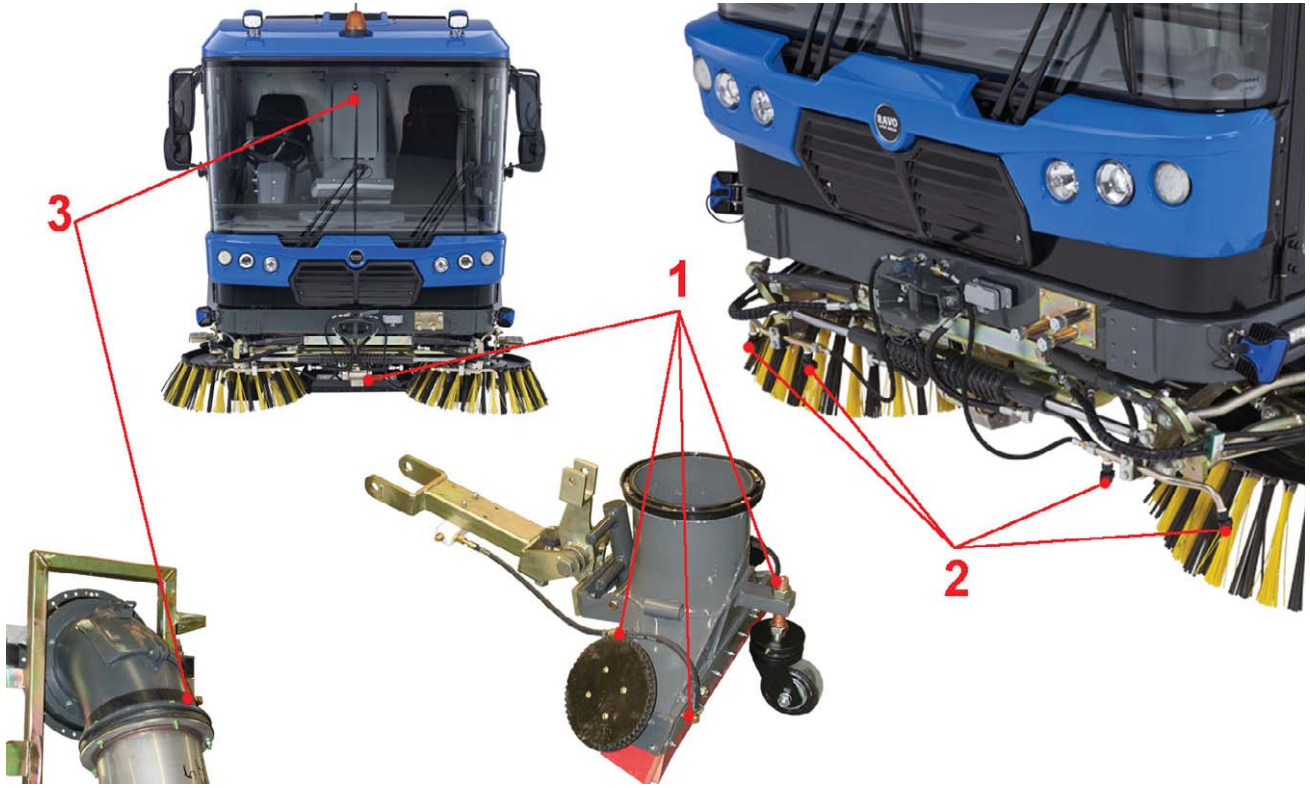
MAKE SURE THAT THE MACHINE IS SAFE TO WORK ON.ENGINE OFF, HANDBRAKE ON.

F. 3.1 Removing brush:

- Start the engine
- Lower the brushes to the ground
- Stop the engine
- Turn the nuts (3) two turns anti-clockwise
- Rotate the brush (1) until the nuts are visible through the holes in the quick release plate (2)
- Remove the brush.

F. 3.2 Fitting brush:

- Fit new brush in the reverse order.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F. 4 Daily sprayer maintenance

The sweeper must be thoroughly cleaned every day after sweeping and dumping.This improves the quality of the sweeping work and extends the life of the sweeper.

NOTE
PERFORM CLEANING WORK IN AN AREA INTENDED FOR THIS PURPOSE.

F. 4.1 Cleaning suction tube, suction nozzle and suction nozzle sprayers

- Start the sweeper's engine
- Lower the brushes and the suction nozzle, open the suction nozzle valve and activate the suction nozzle sprayers
- Check whether the spray jets in the suction nozzle (1) are providing sufficient water
- Open the suction tube inspection hatch and check whether the suction tube spray nozzle (3) is providing sufficient water
- Switch off the suction nozzle sprayers
- Retract the brushes
- Stop the sweeper's engine

If the sprayers in the suction nozzle or suction tube are not spraying or not spraying properly:
- Dismantle the clogged nozzles
- Clean or replace the nozzles (1) or (3)

F. 4.2 Cleaning brush sprayers

- Start the sweeper's engine
- Lower the brushes and the suction nozzle, and activate the brush sprayers
- Ensure that the spray jets are clearly visible (have a second person do this)
- Switch off the brush sprayers
- Retract the brushes
- Stop the sweeper's engine

If the brush sprayers are not spraying or not spraying properly:
- Dismantle the clogged nozzles
- Clean or replace the brush sprayers (2)

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F. 5 Cleaning sweeper container

The sweeper container must be thoroughly cleaned every day after sweeping and dumping.This improves the quality of the sweeping work and extends the life of the sweeper.

⚠
NOTE
CLEAN THE MACHINE OUTSIDE IN AN AREA INTENDED FOR THIS PURPOSE.MAKE SURE THE SWEEPER IS ON A LEVEL SURFACE AND THE CONTAINER IS NOT TILTED.

F. 5.1 Cleaning suction tube, suction nozzle (1)

- Start the sweeper's engine
- Lower the suction nozzle and brushes, open the suction nozzle valve and activate the suction fan
- Spray lots of water (low pressure) at the suction nozzle opening for at least two minutes.This thoroughly cleans the inside of the suction nozzle and suction tube

F. 5.2 Cleaning container (2)

- Stop the suction fan
- Open the rear flap and fit the safety support
- Stop the engine
- Hose down the interior surfaces of the container and interior grids with ample water (low pressure).

F. 5.3 Cleaning the first interior grid (3)

- Remove the first interior grid
- Hose down the interior grid with ample water (low pressure)
- Remove the entire grid from the container.

F. 5.4 Cleaning second interior grid (4)

- Remove the second interior grid.Use a hook
- Hose down the interior grid with ample water (low pressure)
- Spray the top of the container and the fan opening clean with ample water
- Fit both interior grids in the container in the correct manner.

F. 5.5 Cleaning pusher (5) (only for CD version)

- Extend the container dump pusher as far as it will go
- Hose down the area behind the container dump pusher with ample water directed through the inspection hatch (for at least two minutes)
- This will remove any fouling that has accumulated behind the container dump pusher
- Close the inspection hatch on the side of the container
- Retract the container dump pusher.
- Close the service door

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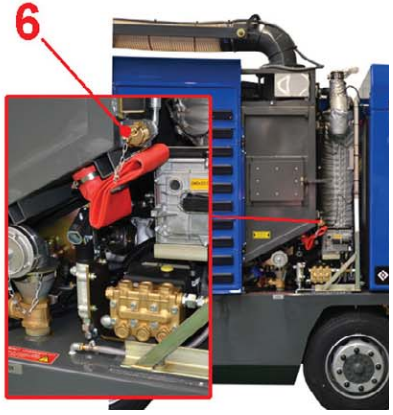
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F. 5.6 Cleaning fan (6)

- Open the right-hand service door
- Attach the water hose to the suction fan cleaning fitting
- Check that there are no persons or loose objects in the container, and close the rear flap
- Start the sweeper's engine
- Lower the suction nozzle and brushes, and activate the suction fan
- Spray water through the fan cleaning fitting in the container for two minutes
- Retract the brushes and stop the suction fan
- Remove the water hose and close the service door
- Open the rear flap of the container and allow excess water to drain.
- Close the rear flap and drive the sweeper back to its parking place.

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F. 6 Cleaning the outside of the machine

WARNING
NEVER USE A STEAM CLEANER TO CLEAN THE MACHINE.

WARNING
WHEN USING A HIGH-PRESSURE HOSE, ALWAYS KEEP THE SPRAY LANCE AT LEAST 50 CM AWAY FROM THE MACHINE. ALWAYS SPRAY THE MACHINE AT A RIGHT ANGLE. THIS WILL AVOID DAMAGE TO THE MACHINE.

WARNING
NEVER POINT A HIGH-PRESSURE JET OF WATER TOWARDS ELECTRICAL COMPONENTS, SUCH AS: WIRING, PLUGS, SENSORS..

COMMENT
CLEAN THE MACHINE OUTSIDE IN AN AREA INTENDED FOR THIS PURPOSE.

F. 6.1 Cleaning

- Wash the machine with plenty of lukewarm water. Do not use an aggressive cleaning product.
- Do not wash the machine in strong sunlight.
- Always use a clean sponge or a washing brush with plenty of water.
- Use a clean, damp shammy leather to dry the machine. Regularly rinse the shammy leather when drying the machine. Do not leave the machine in the sun to dry.

WARNING
DO NOT USE AN ABRASIVE OR ALCOHOLIC MAINTENANCE PRODUCT (E.G. GLASS CLEANER OR METHYLATED SPIRITS), A THINNER OR TRICHLOROETHYLENE.

F. 7 Daily inspection points

CAUTION!
FOR OPTIMAL OPERATIONAL SAFETY AND SECURITY, ALL THE INSPECTION POINTS MUST BE ACCURATELY CHECKED IN THE SPECIFIED MANNER.

F. 7.1 General information

Check the ground under the sweeper for any diesel, lubricant, hydraulic oil or water, which may indicate that there is a leak.

COMMENT
IF THERE ARE ANY TRACES OF LIQUID THAT MAY INDICATE A LEAK, FIND OUT WHERE THEY ORIGINATE FROM, MAKE SURE THE LIQUID THAT IS LEAKING IS COLLECTED AND CONTACT THE SERVICE DEPARTMENT.

F. 7.2 Checking the fuel level

The quantity of fuel in the tank can be read on the instrument panel. The quantity of fuel is displayed on an analogue gauge. Top up the water if the level is low.

COMMENT
DUE TO CONDENSATION, IT IS BETTER TO FILL UP THE SWEEPER BEFORE IT IS PARKED FOR ANY LENGTH OF TIME.

COMMENT
IF THE FUEL TANK BECOMES COMPLETELY EMPTY, THE ENTIRE FUEL SYSTEM CAN BE BLED USING THE PUMP ON THE FUEL PRE-FILTER.

F. 7.3 Checking the lighting

If a light is not working, first check the fuse (see "Fuses"). If there is nothing wrong with the fuse, replace the broken bulb (see "Changing the light bulbs").

F. 7.4 Checking the tyre pressure

Front: 8.5 bar.

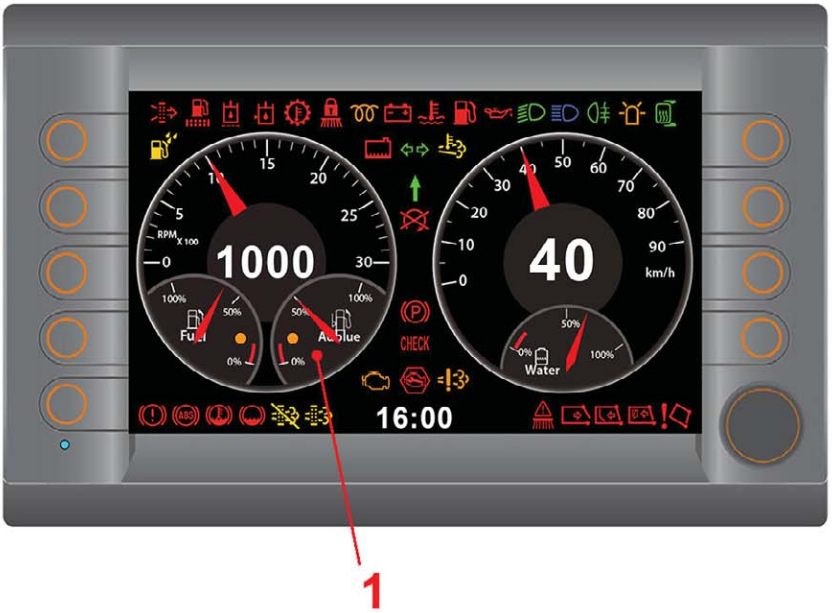
Rear: 7 bar.

WARNING
NEVER FILL THE WATER TANK WITH SALT WATER OR WATER TO WHICH CHEMICAL INGREDIENTS HAVE BEEN ADDED. THIS MAY CAUSE DAMAGE TO THE WATER SYSTEM.

WARNING
ALWAYS ENSURE THAT CLEAN AND FRESH WATER IS USED DURING SWEEPING OPERATIONS. UNFRESH, BRACKISH WATER MAY CAUSE DAMAGE TO HEALTH. PREVENT BACTERIAL INFECTIONS BY REGULARLY RINSING THE WATER SYSTEM THROUGH WITH CLEAN WATER.

F. 7.5 Checking the level of water in the spray water tank

The quantity of spray water in the tank can be read on the instrument panel. The quantity of water is displayed on the spraywater level indicator. Top up the water if the level is low.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F. 7.6 Checking the AdBlue tank level

The quantity of AdBlue in the tank can be read on the iSystem LED panel.Top up the AdBlue if the level is low.Check the AdBlue level every day.

WARNING

MAKE SURE THE ADBLUE SYSTEM DOES NOT BECOME CONTAMINATED WITH DIESEL, HYDRAULIC OIL OR COOLANT.CONTAMINATION WILL CAUSE IRREPARABLE DAMAGE TO THE SYSTEM AND THE SYSTEM'S WARRANTY WILL NO LONGER BE VALID.

WARNING

ALWAYS USE ADBLUE WITH THE SPECIFICATIONS: DIN70070 OR ISO 22241.THE USE OF OTHER LIQUIDS WILL CAUSE IRREPARABLE DAMAGE TO THE SYSTEM.

NOTE

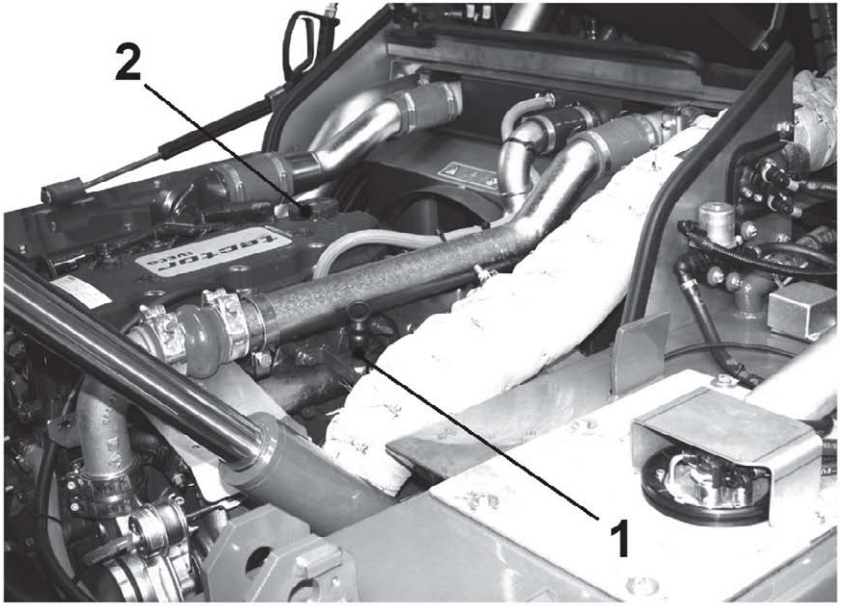
DRIVING WITH A LOW ADBLUE LEVEL WILL HARM THE ENVIRONMENT.THE VEHICLE WILL THEN NO LONGER MEET THE EURO5 STANDARD.THE ENGINE'S POWER WILL BE REDUCED BY THE SYSTEM.

F. 7.6.1 Practical tips (DOs)

- Use a funnel when topping up the AdBlue tank.Never use this funnel for anything else.
- Make sure the area around the AdBlue tank cap is always clean
- Only fill the AdBlue tank with AdBlue that meets the specifications

F. 7.6.2 Practical tips (DON'Ts)

- Never fill the AdBlue tank with diesel
- Never fill the diesel tank with AdBlue
- Never fill the AdBlue tank with contaminated AdBlue
- Never fill the AdBlue tank with AdBlue which has been diluted with water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F. 7.7 Inspection points for the engine oil

Check the level of the engine oil. It is recommended to tip up the container and to open the container door every evening after parking it in the garage. The oil level can only be measured immediately if the sweeper was parked the night before with the container tipped up. If the sweeper was parked whilst the container was not tipped up, then the container must first be tipped up and the engine must then be stopped.

DANGER
PLACE THE SAFETY BRACKET UNDER THE CONTAINER WHEN IT IS TIPPED UP BEFORE CARRYING OUT ANY WORK UNDER THE CONTAINER.

The oil level can only be measured after a minimum of 5 minutes has passed after stopping the sweeper's engine.

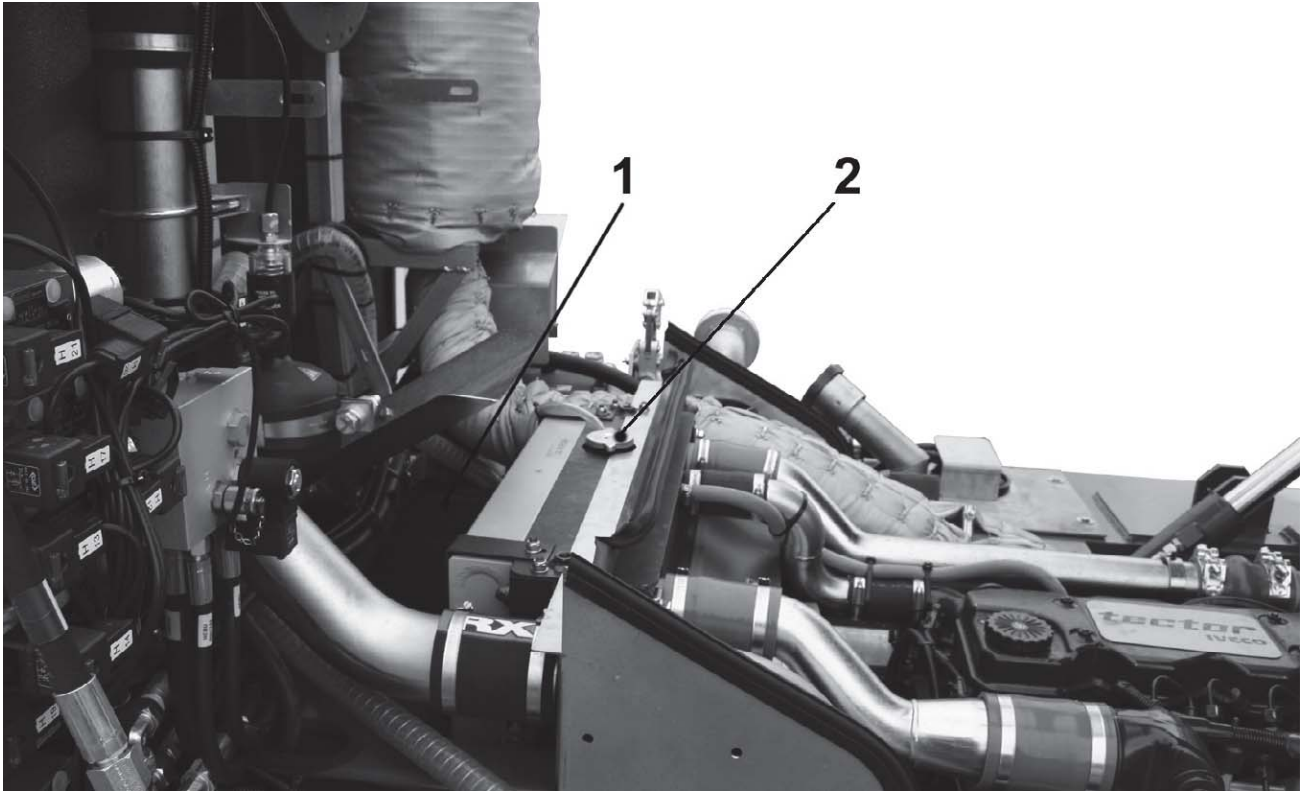
F. 7.7.1 Measuring the oil level:

- Take a clean cloth or rag.
- Remove the oil dipstick (1) from the engine.
- Clean the dipstick (1) with the cloth or rag.
- Place the dipstick (1) back in the engine as far as possible.
- Remove the dipstick (1) from the engine again.
- Check whether the oil level is between the maximum and minimum marks.
- If the oil level is below the minimum mark, then the oil must be topped up (see opposite).
- Place the dipstick (1) back in the engine as far as possible.

F. 7.7.2 Topping up the oil:

- First, clean the area surrounding the oil filler cap (2).
- Unscrew the oil filler cap (2) from the cylinder-head cover.
- Use a funnel or an oil can to add the required quantity of oil (see "Technical specifications" for the correct type of oil).
- Screw the oil filler cap (2) back on.

CAUTION!
CONSIDER THE ENVIRONMENT. CLEAN SPILT OIL IMMEDIATELY. PLACE A CLOTH OR RAG THAT HAS OIL ON IT IN THE CHEMICAL WASTE CONTAINER. ALSO PLACE OTHER WASTE PRODUCTS THAT HAVE OIL IN THEM (E.G. CANS, PLASTIC BOTTLES, ETC.) IN THE CHEMICAL WASTE CONTAINER.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F. 7.8 Checking the engine coolant level

Check the engine coolant level whilst the container is tipped up.

F. 7.8.1 Checking the coolant:

- The engine must be cold or must have cooled down sufficiently (temperature below 30° C).
- Carefully unscrew the radiator cap (2).
- Visually inspect the coolant level. It should be approximately 3 cm below the filler opening. Use a funnel or a can to add the required quantity of coolant (see "Technical specifications" for the correct type of coolant).

⚠
WARNING
COOLANT CAN BE AGGRESSIVE AND MAY CAUSE STAINS. WEAR SUITABLE GLOVES AND PROTECTIVE CLOTHING.

- Screw the cap (2) back on.
- Once the engine oil level and the coolant level have been checked and, if necessary, topped up, remove the safety brackets and lower the container.

F. 7.9 Checking whether waste has collected in front of the intercooler

Check the front of the intercooler (1) to see whether any waste has collected there.

- Remove any waste that has collected there.

⚠
COMMENT
IF THERE IS ANY WASTE BETWEEN THE INTERCOOLER AND THE RADIATOR, CONTACT YOUR SERVICE DEALER AND HAVE HIM REMOVE THE WASTE. A CONTAMINATED RADIATOR LOSES ITS COOLING CAPACITY!

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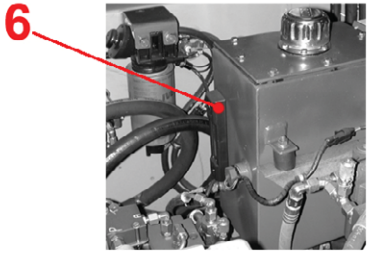
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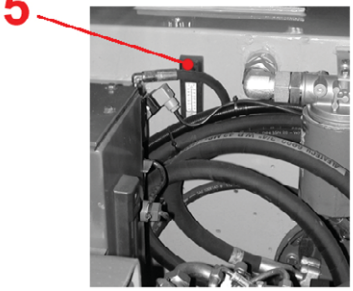
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F. 7.10 Checking the hydraulic system

Check the hydraulic oil level every day. The level of the hydraulic oil in the tank can be read on the combined level/temperature gauge (5). The gauge is located inside the rear of the sweeper's chassis on the left-hand side.

COMMENT
THE HYDRAULIC OIL LEVEL MUST BE READ WHILST THE ENGINE IS TURNED OFF.

When the engine is turned off, the hydraulic oil level must be two thirds of the way up the meter's gauge glass. The temperature of the hydraulic oil can also be read on this gauge.

F. 7.11 Topping up the spray water

- Open the service door (1).
- Remove the water tank's cap (4).
- Open the tap (7).
- Fill the tank with water.

F. 7.12 Checking the container

- Check the seal between the suction tube and the container.
- Check whether the container (2) has been fully lowered.
- Check whether the container door (3) has been closed properly.
- Check whether the inspection hatch and the service door (1) have been closed properly.

F. 7.13 Checking the ATF system

Check the ATF oil level every day. The level of the ATF oil in the tank can be read on the combined level/temperature gauge (6). The gauge is located at the back of the frame on the right-hand side of the sweeper's ATF oil tank.

COMMENT
THE ATF OIL LEVEL MUST BE READ WHILST THE ENGINE IS TURNED OFF.

When the engine is turned off, the ATF oil level must reach the top of the meter's gauge glass. The temperature of the ATF oil can also be read on this gauge.

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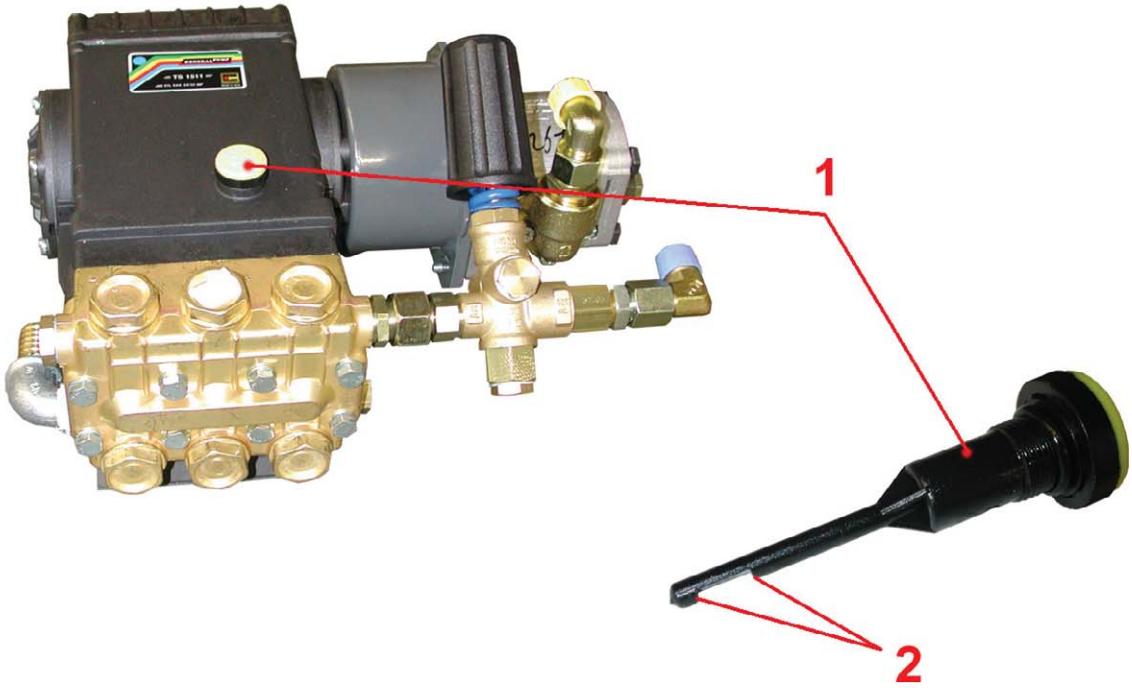
F. 7.14 Topping up the washer fluid:

WARNING
WASHER FLUID CONTAINS SUBSTANCES WHICH ARE FLAMMABLE.THEREFORE ALWAYS KEEP WASHER FLUID AWAY FROM FIRE AND HEAT SOURCES.ALWAYS REMOVE SPILLED WASHER FLUID WHEN TOPPING OFF.

- Open the left service door of the container (1)
- Remove the cap (2) from the washer fluid reservoir
- Fill the screen wash container (1) with screen wash.
- Fit the cap (2)
- Close the left service door of the container (1).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F. 7.15 Check the oil level of the high-pressure water pump (option)

F. 7.15.1 Measuring the oil level:

- Take a clean cloth or rag
- Remove the oil dipstick (1) from the high-pressure water pump
- Clean the dipstick (1) with the cloth or rag
- Place the dipstick (1) back in the high-pressure water pump as far as possible
- Remove the dipstick (1) from the high-pressure water pump again
- Check whether the oil is between the maximum and minimum marks (2)
- If the oil level is below the minimum mark, then the oil must be topped up
- Place the dipstick (1) back in the high-pressure water pump as far as possible.

F. 7.15.2 Topping up the oil:

- First, clean the area surrounding the oil dipstick (1)
- Unscrew the oil dipstick (1)
- Use a funnel or an oil can to add the required quantity of oil (see ‘Technical specifications’ for the correct type of oil)
- Screw the oil dipstick (1) back on.

CAUTION
NEVER FILL THE OIL LEVEL ABOVE THE MAX.LEVEL.REMOVE ANY EXCESS OIL.

CAUTION
CONSIDER THE ENVIRONMENT.CLEAN SPILT OIL IMMEDIATELY.PLACE A CLOTH OR RAG THAT HAS OIL ON IT IN THE CHEMICAL WASTE CONTAINER.ALSO PLACE OTHER WASTE PRODUCTS THAT HAVE OIL IN THEM (E.G. CANS, PLASTIC BOTTLES, ETC.) IN THE CHEMICAL WASTE CONTAINER.

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F. 8 Changing the light bulbs

The lights must be checked each day to verify that they are in good working order.Any defective bulbs must be replaced as quickly as possible by the same type of bulb (see the technical specifications).The sweeper's light bulbs can be changed very easily.

⚠
CAUTION
BEFORE CHANGING THE LIGHT BULBS VERIFY THAT THE MACHINE HAS BEEN TURNED OFF AND THE KEY HAS BEEN REMOVED.

F. 8.1 Main beam headlight (1)

- Remove the panels in the cabin behind the headlights
- Remove the protective cover from the light
- Replace the bulb concerned
- Fit the cover
- Fit the panels.

F. 8.2 Dipped beam headlight (2)

- Remove the panels in the cabin behind the headlights
- Remove the protective cover from the light
- Replace the bulb concerned
- Fit the cover
- Fit the panels.

F. 8.3 Direction indicator lights front (3)

- Remove the panels in the cabin behind the headlights
- Remove the nut and plug
- Replace the indicator light
- Fit the nut and plug.
- Fit the panels.

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F. 8.4 Parking lights (4)

- Remove the panels in the cabin behind the headlights
- Remove the nut and plug
- Replace the parking light
- Fit the nut and plug.
- Fit the panels.

F. 8.5 Indicator lights on the side of the cabin (5)

- Remove the black cover
- Remove the screws and plug
- Remove the indicator light bulb
- Fit the indicator light bulb with plug and screws
- Fit the black cover.

F. 8.6 Brush light (6)

- Remove the screws
- Remove the lens
- Replace the bulb
- Fit the lens
- Fit the screws.

F. 8.7 Front and rear beacon lights (7)

⚠
CAUTION
USE A STURDY LADDER OR PLATFORM TO REACH THE BEACON LIGHT AT THE FRONT OR REAR OF THE SWEEPER.

- Place the ladder or platform at the front or rear of the sweeper
- Remove the cover by turning it a quarter of a turn
- Replace the bulb
- Fit the cover and tighten
- Remove the ladder or platform.

⚠
NOTE
IN THE CASE OF A LED BEACON LIGHT, THE ENTIRE UNIT MUST BE REPLACED.

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F. 8.8 Rear indicator lights (8)
- Remove the nut and plug
- Remove the indicator light bulb
- Fit the indicator light bulb
- Fit the nut and plug.

F. 8.9 Brake light (9)
- Remove the nut and plug
- Remove the indicator light bulb
- Fit the indicator light bulb
- Fit the nut and plug.

F. 8.10 Tail light (10)
- Remove the nut and plug
- Remove the indicator light bulb
- Fit the indicator light bulb
- Fit the nut and plug.

F. 8.11 Reverse light (11) only on 560
- Remove the screws
- Remove the lens
- Replace the bulb concerned
- Fit the lens
- Fit the screws.

F. 8.12 Rear fog light (12) only on 560
- Remove the screws
- Remove the lens
- Replace the bulb concerned
- Fit the lens
- Fit the screws.

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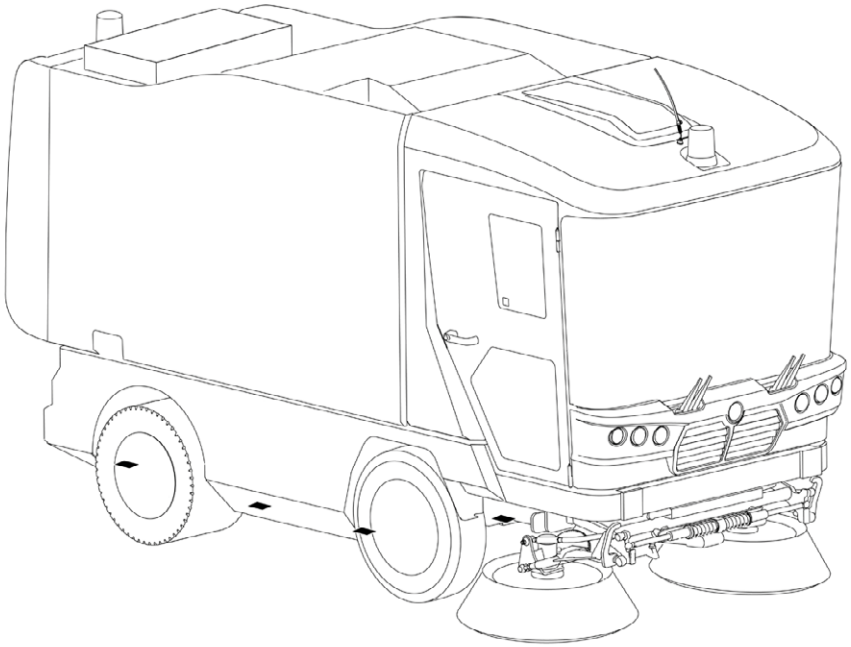
F. 8.13 Reverse light (13) only connected on 540

- Remove the nut and plug
- Remove the indicator light bulb
- Fit the indicator light bulb
- Fit the nut and plug.

F. 8.14 Rear fog light (14) only connected on 540

- Remove the nut and plug
- Remove the indicator light bulb
- Fit the indicator light bulb
- Fit the nut and plug.

Front indicator lights	LED
Rear indicator lights	LED
Indicator light on the side of the cabin	LED
Rear light	LED
Dipped beam/Main beam	H7-24V/70W
Parking lights	LED
Brake light	LED
Reverse light	LED (560 = 24V/21W bayonet)
Beacon light	H1-24V-70W/LED
Brush light	H3-24V/70W/LED
Fog light	LED



F. 9 Changing a wheel

Wheels should preferably be changed in a garage on a stable, solid surface.

WARNING
USE A LOW-PROFILE HYDRAULIC JACK WITH A LIFTING CAPACITY OF AT LEAST 5000 KG.

WARNING
ALWAYS OBSERVE THE PRESCRIBED TIGHTENING TORQUES. EXCEEDING THE SPECIFIED TIGHTENING TORQUE MAY CAUSE DAMAGE.

F. 9.1 Changing a wheel

- Start the engine
- Raise the front axle to its highest position
- Make sure the handbrake is applied
- Switch off the engine and remove the ignition key
- Place a block in front of the wheels
- Unscrew the wheel nuts by one turn
- Place the jack under the appropriate jacking point (see support area drawing).

NOTE
ENSURE A SUFFICIENTLY LARGE BEARING SURFACE BETWEEN THE JACK AND THE JACK POINTS, FOR EXAMPLE, BY USING A SHEET OR BLOCK OF WOOD.

- Raise the vehicle with the jack
- Unscrew the wheel nuts completely once the wheel is off the floor
- Change the wheel
- Fit the wheel nuts and finger-tighten diagonally
- Let down the jack until the weight is fully back on the wheels.
- Tighten the wheel bolts using a torque wrench and a tightening torque of 300 Nm for the rear and 350 Nm for the front wheels.

DRIVE
TOW
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F. 10 Towing the vehicle

If the vehicle breaks down during use and it is not possible to repair it on site, it may be towed, as follows

WARNING

ONLY TOW THE SWEEPER OR ATTACH A DRIVE TO THE REAR WHEELS AS DESCRIBED BELOW. ALWAYS USE A TOWBAR WHEN MOVING THE SWEEPER.

WARNING

ALWAYS PLACE WEDGES IN FRONT OF AND BEHIND THE WHEELS OF THE SWEEPER BEFORE YOU START TO WORK WITH THE PARKING BRAKE ON, MAKE SURE THAT THE SWEEPER IS NOT ABLE TO START DRIVING OF ITS OWN ACCORD.

F. 10.1 Towing

- Switch off the diesel engine. This engages the parking brake
- Deactivate the parking brake (see deactivating parking brake)
- Remove the protection plate (1) from both rear wheels
- On the two rear wheels, turn the socket-head screws (2) in the direction of the arrow TOW (clockwise)

PROCEED WITH CARE

ALWAYS PLACE WEDGES IN FRONT OF AND BEHIND THE WHEELS OF THE SWEEPER BEFORE YOU START TO WORK WITH THE PARKING BRAKE ON, MAKE SURE THAT THE SWEEPER IS NOT ABLE TO START DRIVING OF ITS OWN ACCORD.

- Switch on the alarm lighting.
- Connect the towbar between the roadsweeper and the towing vehicle

WARNING

TOW THE MACHINE AT A MAXIMUM SPEED OF 15 KM/H. STEERING WILL BE MORE DIFFICULT DUE TO THE LACK OF HYDRAULIC POWER AND THE BRAKE SYSTEM MAY FAIL. ALWAYS USE A TOW BAR.

- To return the vehicle to the driving position, follow the above instructions in the reverse order.

PROCEED WITH CARE

CAREFULLY TURN THE SOCKET-HEAD SCREWS IN THE DIRECTION OF THE DRIVE ARROW UNTIL YOU MEET RESISTANCE. DO NOT TIGHTEN FURTHER AS THIS CAN CAUSE DAMAGE TO THE DISCONNECTING MECHANISM.

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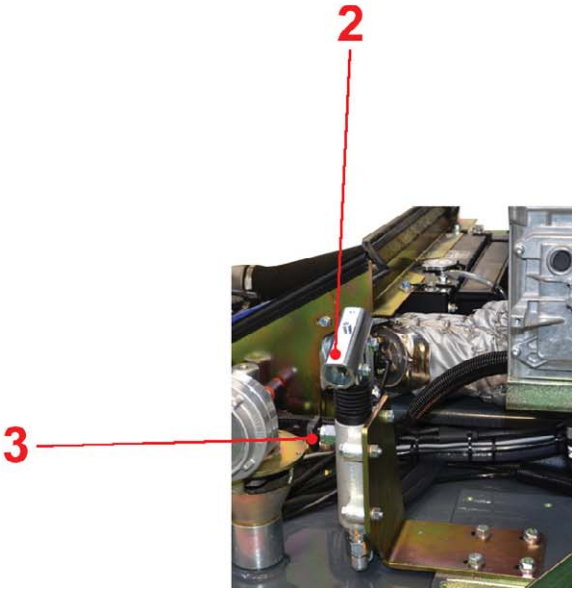
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F. 11 Raising the hopper whilst the engine is turned off

It is not possible to tip up the hopper using the buttons in the cabin when the engine is turned off or when the engine is not working.There will then be no hydraulic pressure.

WARNING
ALWAYS FIT THE SAFETY BRACKETS WHEN THE HOPPER IS TIPPED UP.

F. 11.1 Raising the hopper using the emergency hand pump

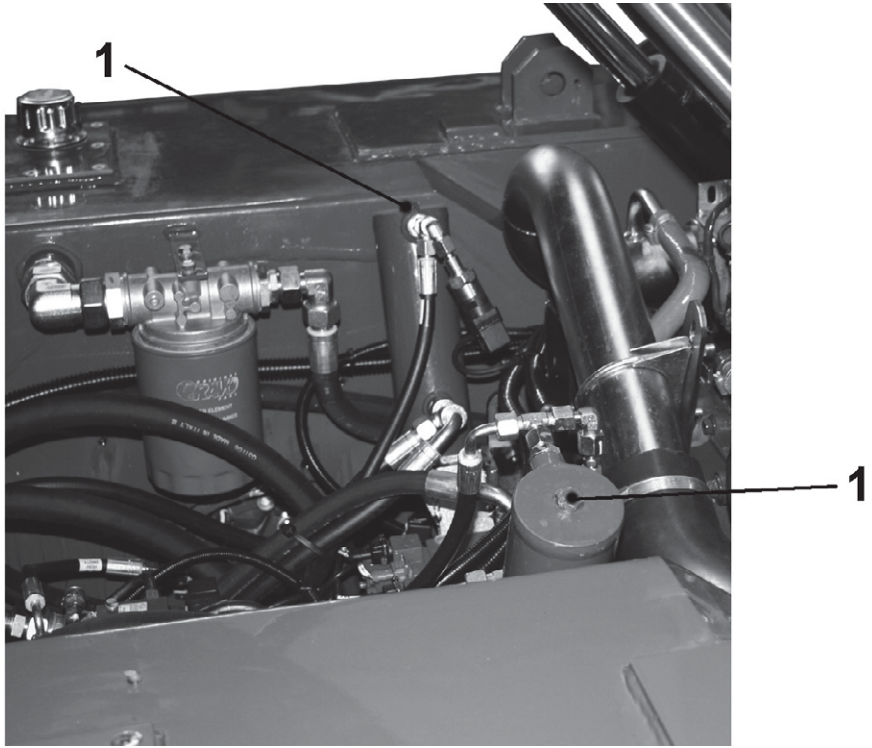
- Open the service door (1) (always on the right-hand side of the sweeper)
- Ensure that the valve (3) on the hand pump (2) is closed (turn valve clockwise)
- Place the pump lever in the hand pump (2)
- Raise the container by moving the pump lever up and down
- Place the safety brackets under the container once the container has been raised.

NOTE
IF THE CONTAINER HAS BEEN RAISED WITH THE HAND PUMP AND THERE IS NO HYDRAULIC PRESSURE, IT WILL NOT BE POSSIBLE TO LOWER THE CONTAINER.

WARNING
THE FOLLOWING PROCEDURE IS UNSAFE AND IS THEREFORE ONLY RECOMMENDED FOR USE IN EMERGENCY SITUATIONS.

F. 11.2 Raising and lowering the container using the emergency hand pump (not recommended)

- Open the service door (1) (always on the right-hand side of the sweeper)
- Ensure that the valve (3) on the hand pump (2) is closed (turn valve clockwise)
- Place the pump lever in the hand pump (2)
- Raise the container by moving the pump lever up and down (make sure the container is not raised too high, otherwise it will not be possible to lower the container using the hand pump)
- Make sure the container is temporarily locked in position as quickly as possible (for example, by using blocks of wood)
- Remove the temporary container lock
- Now lower the container
- Slowly open the valve (3) of the hand pump (2) (turn anti-clockwise). Once the container starts to move do not open the valve any further
- The container is lowered back onto the frame under its own weight
- Close the valve (3) on the hand pump (2) (turn valve clockwise)
- Remove the pump lever
- Close the service door (1).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F. 12 Deactivating the parking brake

When the engine is switched off or defective the parking brake will be activated after a period of time due to pressure drop in the hydraulic system. If the machine needs to be moved (e.g. following engine failure) the parking brake will have to be deactivated.

WARNING
ONLY DEACTIVATE THE PARKING BRAKE IN THE EVENT OF AN EMERGENCY. THE PARKING BRAKE MUST BE ACTIVATED AGAIN ONCE THE VEHICLE HAS BEEN REPAIRED.

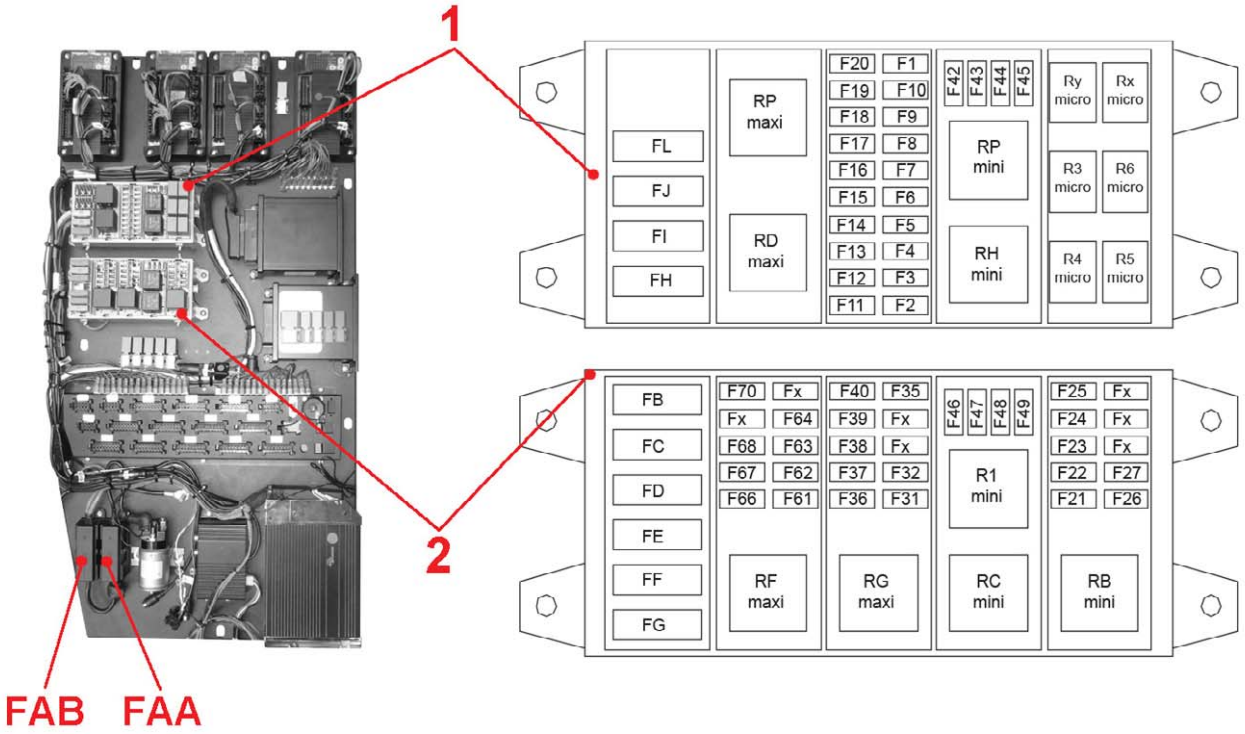
WARNING
ALWAYS FIT THE SAFETY STAY WHEN THE CONTAINER IS TIPPED UP.

WARNING
ALWAYS PLACE WEDGES IN FRONT OF AND BEHIND THE WHEELS OF THE SWEEPER BEFORE YOU START TO WORK WITH THE PARKING BRAKE ON, MAKE SURE THAT THE SWEEPER IS NOT ABLE TO START DRIVING OF ITS OWN ACCORD.

The parking brake is operated by two cylinders in the engine compartment. These cylinders can be disconnected to deactivate the parking brake.

F. 12.1 Disconnecting parking brake

- Remove the two bolts (1) from the parking brake cylinders
- Insert two 100mm bolts in place of the bolts (1) and turn them inwards.
- The parking brake is disconnected.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F36 F31
RG maxi
F46 F47 F48 F49
R1 mini
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RB mini

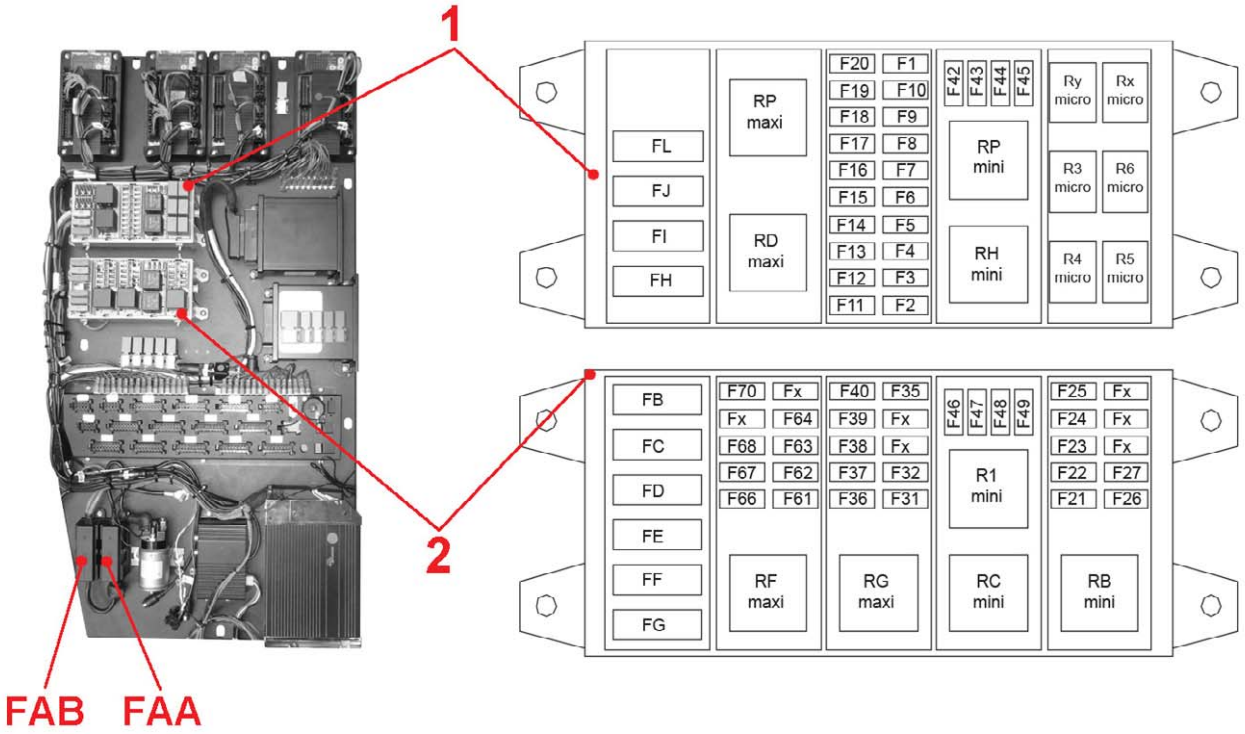
F. 13 Fuses/Relays

The following fuses and relays can be found in the fuse box at the left end of the cabin rear wall and at the left end of the dashboard behind the panel with the fire extinguisher:

CAUTION
ALWAYS REPLACE FUSES WITH FUSES OF THE SAME TYPE, VALUE AND COLOUR.NEVER BRIDGE A FUSE.THIS CAN RESULT IN DAMAGE TO THE ELECTRICAL SYSTEM.

F. 13.1 Fuse/relay box

FUSE	DESCRIPTION	AMPS	POSITION
F101	Radio memory + Tacho	2A	Main panel, Fuse/Relay box 1
F2	Camera	5A	Main panel, Fuse/Relay box 1
F3	Armrest & Dashboard	2A	Main panel, Fuse/Relay box 1
F4	Safety & Key in	2A	Main panel, Fuse/Relay box 1
F5	VBBr PLC	15A	Main panel, Fuse/Relay box 1
F6	VBBo PLC	15A	Main panel, Fuse/Relay box 1
F7	Input Module 1	2A	Main panel, Fuse/Relay box 1
F8	Input Module 2	2A	Main panel, Fuse/Relay box 1
F9	Input Module 3	2A	Main panel, Fuse/Relay box 1
F10	Input Module 4	2A	Main panel, Fuse/Relay box 1
F11	Switchable customer option 1	10A	Main panel, Fuse/Relay box 1
F12	Output module 20, X21	15A	Main panel, Fuse/Relay box 1
F13	Output module 20, X20	15A	Main panel, Fuse/Relay box 1
F14	Output module 22, X21	15A	Main panel, Fuse/Relay box 1
F15	Output module 22, X20	15A	Main panel, Fuse/Relay box 1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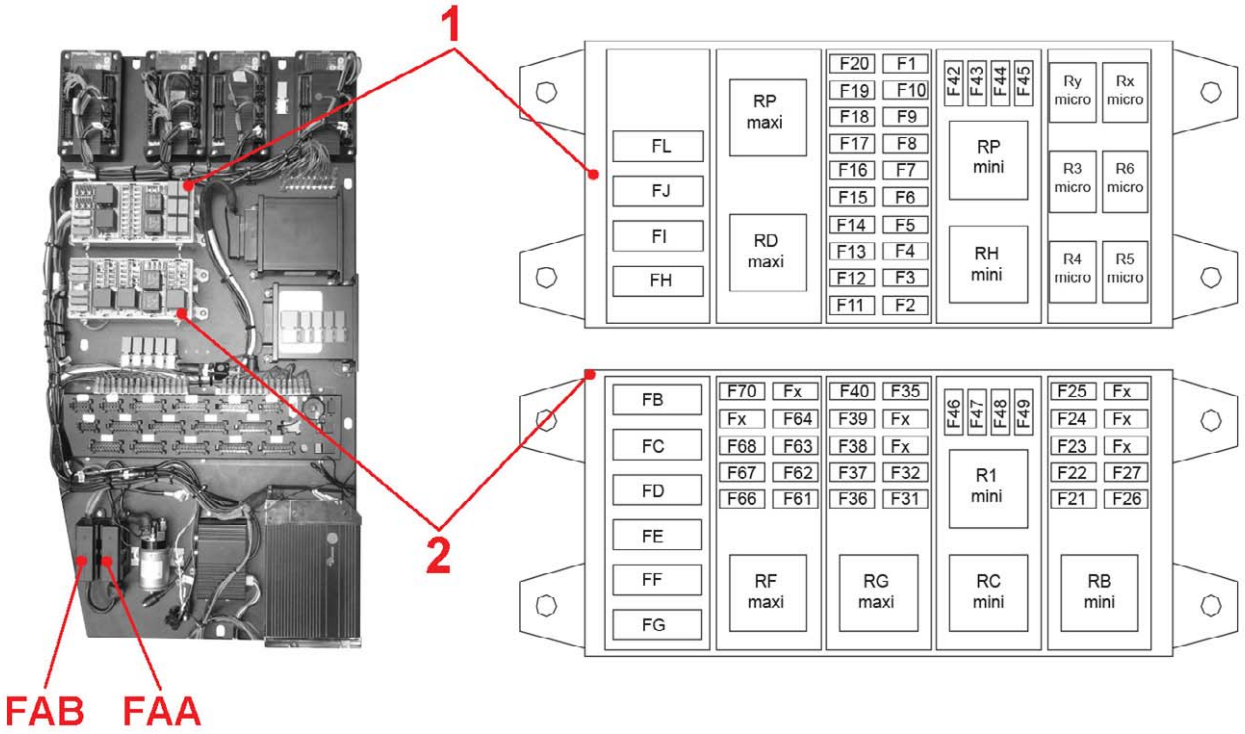
RB mini

FUSE	DESCRIPTION	AMPS	POSITION
F16	Output module 21, X21	15A	Main panel, Fuse/Relay box 1
F17	Output module 21, X20	15A	Main panel, Fuse/Relay box 1
F18	Output module 23, X21	15A	Main panel, Fuse/Relay box 1
F19	Output module 23, X20	15A	Main panel, Fuse/Relay box 1
F20	Switchable customer option 2	10A	Main panel, Fuse/Relay box 1
F21	Option after ignition switch (Lubrication system)	7.5A	Main panel, Fuse/Relay box 2
F22	Option fuse	10A	Main panel, Fuse/Relay box 2
F23	Seat compressor	10A	Main panel, Fuse/Relay box 2
F24	Air-conditioning System cabin	15A	Main panel, Fuse/Relay box 2
F25	Direction indicator	5A	Main panel, Fuse/Relay box 2
F26	Windscreen wiper, Main beam	10A	Main panel, Fuse/Relay box 2
F27	12VDC transformer: spare	7.5A	Main panel, Fuse/Relay box 2
F28	N/A	N/A	N/A
F29	N/A	N/A	N/A
F30	N/A	N/A	N/A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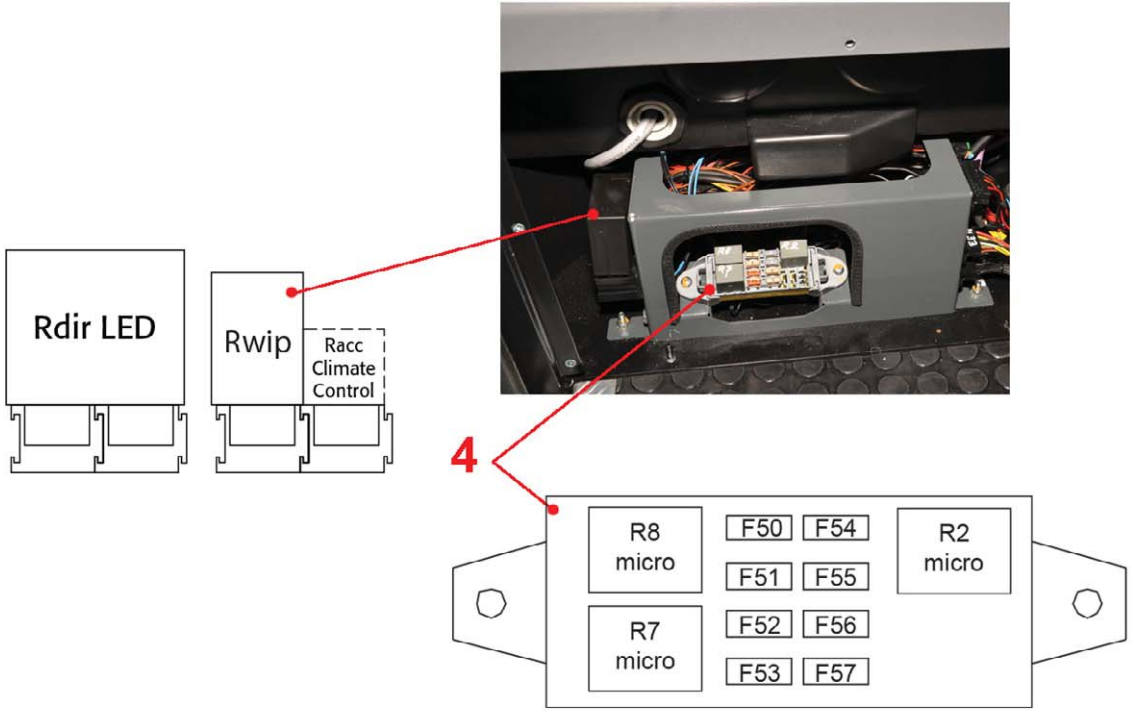
FUSE	DESCRIPTION	AMPS	POSITION
F31	Safety channel 1 + VBBs PLC	5A	Main panel, Fuse/Relay box 2
F32	Safety channel 2	2A	Main panel, Fuse/Relay box 2
F33	N/A	N/A	N/A
F34	N/A	N/A	N/A
F35	FWS, GEN & Oil Temp Sens.	5A	Main panel, Fuse/Relay box 2
F36	On-board computer power	10A	Main panel, Fuse/Relay box 2
F37	On-board computer sensors	2A	Main panel, Fuse/Relay box 2
F38	ABS Power I	5A	Main panel, Fuse/Relay box 2
F39	ABS Power II	5A	Main panel, Fuse/Relay box 2
F40	ABS check lamp & Ignition power	5A	Main panel, Fuse/Relay box 2
F41	N/A	N/A	N/A
F42	EURO 5/6 & TIER3:Motor filter preheater TIER4:Heater diagnostics	15A	Main panel, Fuse/Relay box 1
F43	EURO 5/6 & TIER3:Fuel filter preheater	25A	Main panel, Fuse/Relay box 1
F44	EURO 6:ST82, only EU6	20A	Main panel, Fuse/Relay box 1
F45	EURO 6:Power to sensor NOx NH3, SCR TIER4:Power to preheater DEF module	20A	Main panel, Fuse/Relay box 1
F46	Ignition switch	15A	Main panel, Fuse/Relay box 2
F47	OBD power	5A	Main panel, Fuse/Relay box 2
F48	Instrument panel	5A	Main panel, Fuse/Relay box 2
F49	Ignition switch accessories and Radio/Tacho	5A	Main panel, Fuse/Relay box 2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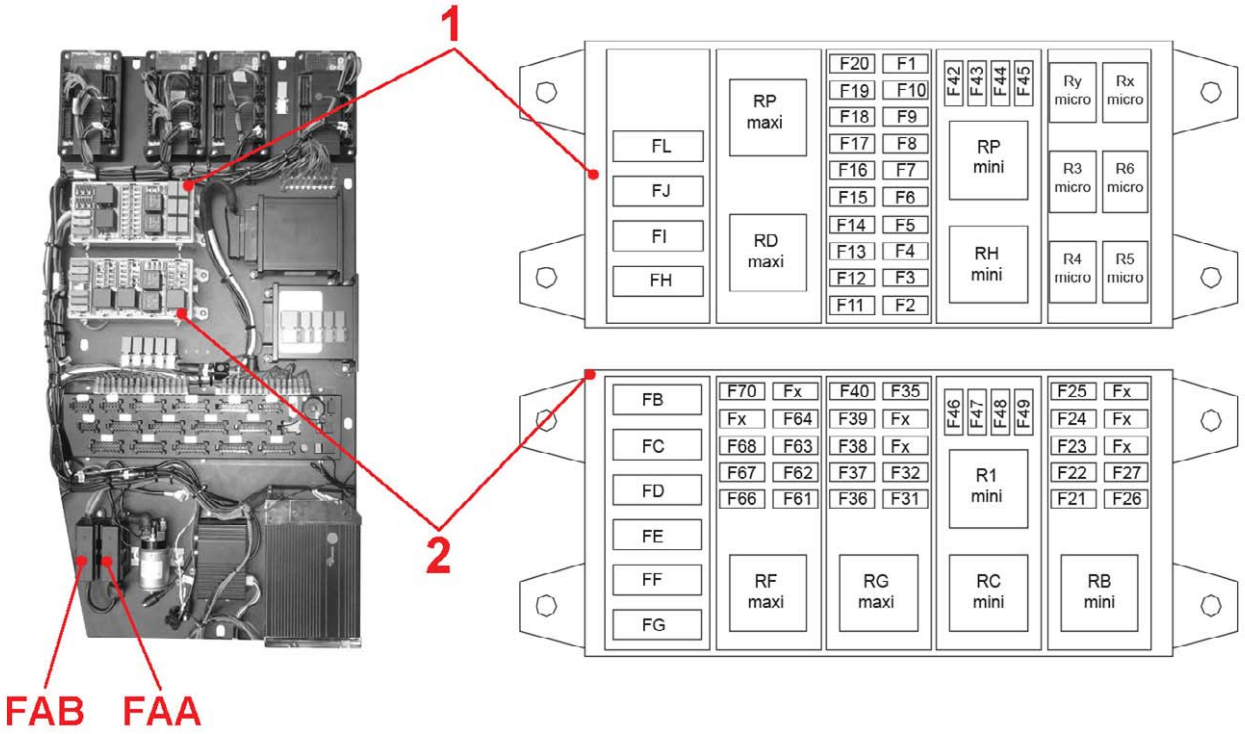
R2
micro

FUSE	DESCRIPTION	AMPS	POSITION
F50	Parking light right, Registration plate lighting	5A	Dashboard, Fuse/Relay box 4
F51	Parking light left	5A	Dashboard, Fuse/Relay box 4
F52	Main beam left	5A	Dashboard, Fuse/Relay box 4
F53	Main beam right	5A	Dashboard, Fuse/Relay box 4
F54	Daytime running lights left & right	2A	Dashboard, Fuse/Relay box 4
F55	Rear fog light	2A	Dashboard, Fuse/Relay box 4
F56	Dipped beam left	5A	Dashboard, Fuse/Relay box 4
F57	Dipped beam right	5A	Dashboard, Fuse/Relay box 4
F58	N/A	N/A	N/A
F59	N/A	N/A	N/A
F60	N/A	N/A	N/A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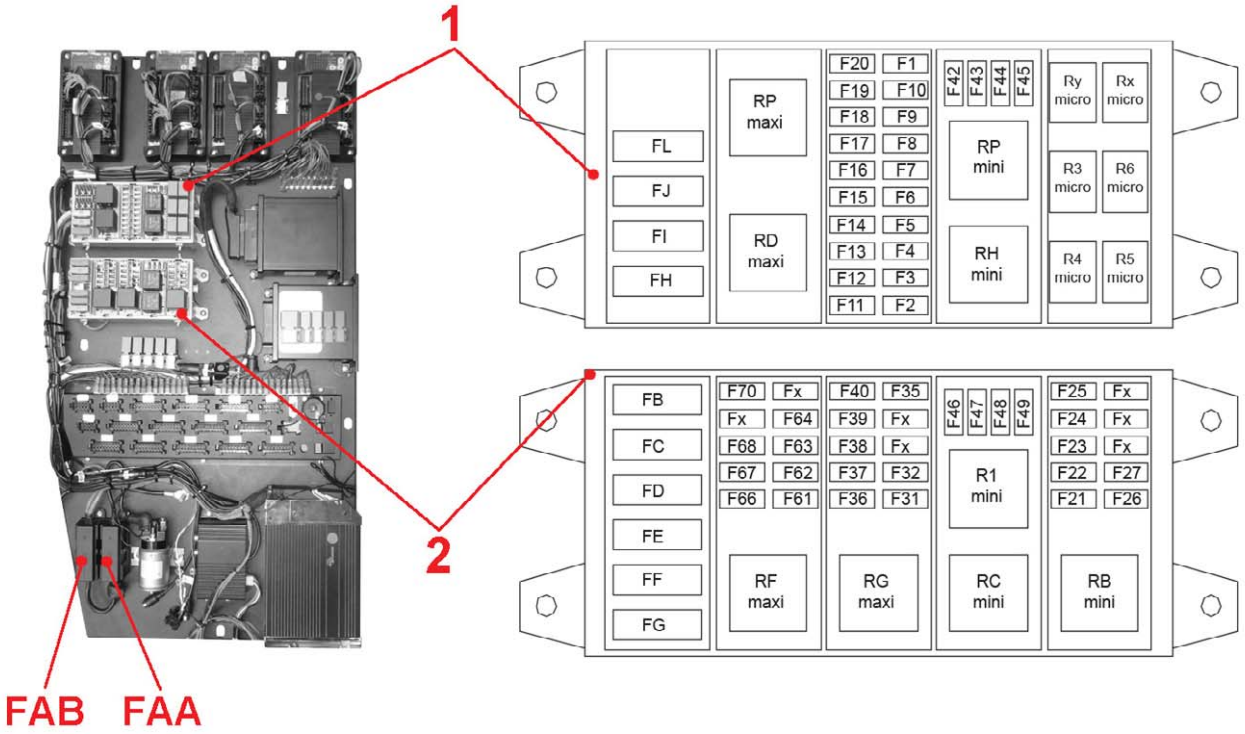
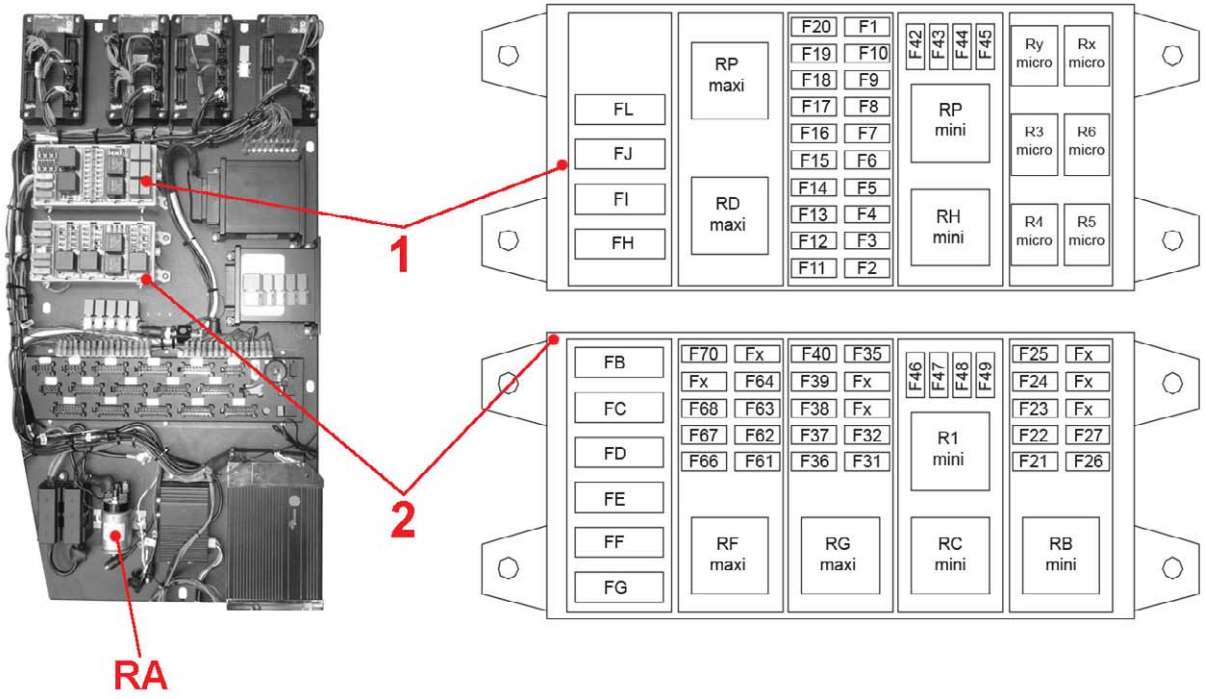
FUSE	DESCRIPTION	AMPS	POSITION
F61	Dipped beam lamps	10A	Main panel, Fuse/Relay box 2
F62	Mirror heating, Beacon lights	10A	Main panel, Fuse/Relay box 2
F63	Air-conditioning clutch and fan	15A	Main panel, Fuse/Relay box 2
F64	Option	10A	Main panel, Fuse/Relay box 2
F65	N/A	N/A	N/A
F66	Hazard lights, Interior lighting	5A	Main panel, Fuse/Relay box 2
F67	Option Lubrication unit	5A	Main panel, Fuse/Relay box 2
F68	Parking lights & taillights	10A	Main panel, Fuse/Relay box 2
F69	N/A	N/A	N/A
F70	N/A	N/A	N/A
F71	N/A	N/A	N/A


1
2
FAB
FAA
FL
FJ
FI
FH
RP maxi
RD maxi
F20 F1
F19 F10
F18 F9
F17 F8
F16 F7
F15 F6
F14 F5
F13 F4
F12 F3
F11 F2
F42 F43 F44 F45
RP mini
RH mini
Ry micro
Rx micro
R3 micro
R6 micro
R4 micro
R5 micro
FB
FC
FD
FE
FF
FG
F70 Fx
Fx F64
F68 F63
F67 F62
F66 F61
RF maxi
F40 F35
F39 Fx
F38 Fx
F37 F32
F36 F31
RG maxi
F46 F47 F48 F49
R1 mini
RC mini
F25 Fx
F24 Fx
F23 Fx
F22 F27
F21 F26
RB mini

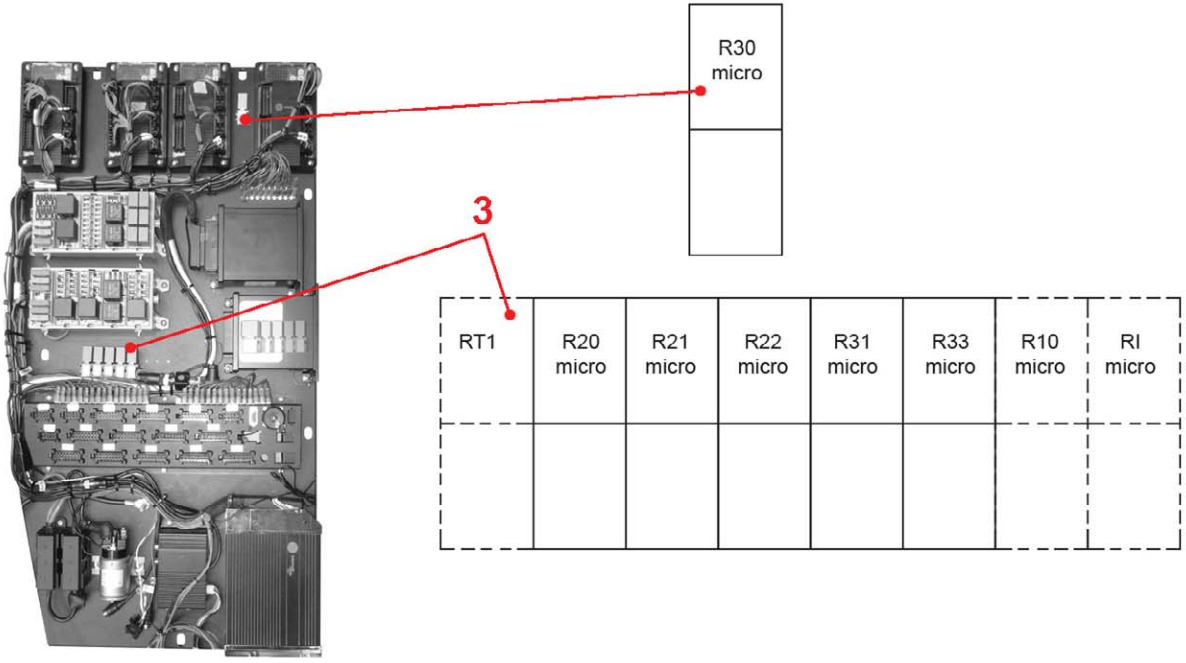
FUSE	DESCRIPTION	AMPS	POSITION
FAA	Main fuse	100A	Main panel
FAB	Main fuse	100A	Main panel
FB	Vehicle I:Brake light, direction indic., heater, air conditioner	40A	Main panel, Fuse/Relay box 2
FC	PLC and inputs	30A	Main panel, Fuse/Relay box 2
FD	Power supply to output boards	40A	Main panel, Fuse/Relay box 2
FE	Power supply to output boards	40A	Main panel, Fuse/Relay box 2
FF	Vehicle II:Lighting	40A	Main panel, Fuse/Relay box 2
FG	Vehicle III:Drive control	30A	Main panel, Fuse/Relay box 2
FH	Motor Power heating	40A	Main panel, Fuse/Relay box 1
FI	EDC Power	30A	Main panel, Fuse/Relay box 1
FJ	DENOX EU5 Power	30A	Main panel, Fuse/Relay box 1
FK	ATF cooler fan, only on R560	25A	Main panel, Fuse/Relay box 1
FL	Power start solenoid, only on TIER 4	50A	Main panel, Fuse/Relay box 1


1
2
RA
FL
FJ
FI
FH
RP maxi
RD maxi
F20 F1
F19 F10
F18 F9
F17 F8
F16 F7
F15 F6
F14 F5
F13 F4
F12 F3
F11 F2
F42 F43 F44 F45
RP mini
RH mini
Ry micro
Rx micro
R3 micro
R6 micro
R4 micro
R5 micro
FB
FC
FD
FE
FF
FG
F70 Fx
Fx F64
F68 F63
F67 F62
F66 F61
F40 F35
F39 Fx
F38 Fx
F37 F32
F36 F31
F46 F47 F48 F49
R1 mini
RC mini
F25 Fx
F24 Fx
F23 Fx
F22 F27
F21 F26
RF maxi
RG maxi
RB mini

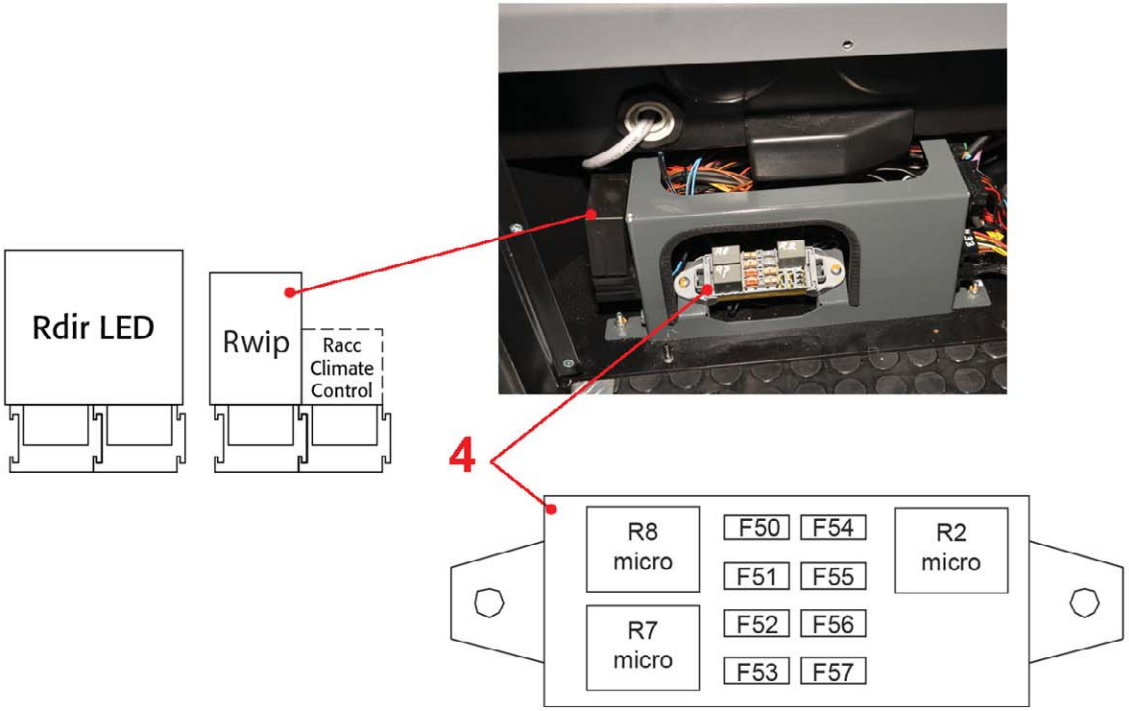
F. 13.2 Relay

?

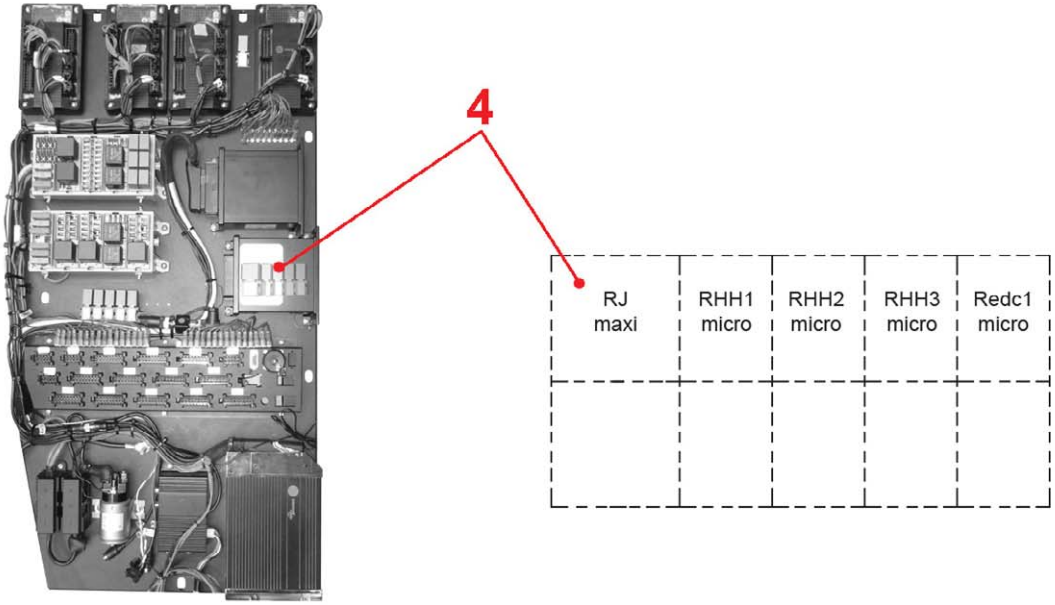
RELAY	DESCRIPTION	TYPE	POSITION
RA	Grid heater relay	BOSCH	Main panel
Rx	Switchable customer option 1	Micro	Main panel, Fuse/Relay box 1
RY	Switchable customer option 2	Micro	Main panel, Fuse/Relay box 1
RD	Power Nodes	Maxi	Main panel, Fuse/Relay box 1
RE	Power Nodes	Maxi	Main panel, Fuse/Relay box 1
RH	Power fuel heater element	Mini	Main panel, Fuse/Relay box 1
RP	Power relay EURO 6/TIER 4	Mini	Main panel, Fuse/Relay box 1
R3	Door switch	Micro	Main panel, Fuse/Relay box 1
R4	Horn	Micro	Main panel, Fuse/Relay box 1
R5	Air conditioning clutch	Micro	Main panel, Fuse/Relay box 1
R6	Air conditioning fan	Micro	Main panel, Fuse/Relay box 1
RF	Power parking light ATF & others	Maxi	Main panel, Fuse/Relay box 2
RG	Power on-board computer	Maxi	Main panel, Fuse/Relay box 2
RB	Power Air conditioning, Flasher, Lighting	Maxi	Main panel, Fuse/Relay box 2
RC	Power PLC Output	Mini	Main panel, Fuse/Relay box 2
R1	Start relay	Mini	Main panel, Fuse/Relay box 2


R30
micro
3
RT1
R20
micro
R21
micro
R22
micro
R31
micro
R33
micro
R10
micro
RI
micro

RELAY	DESCRIPTION	TYPE	POSITION
RT1	Timer relay	Micro	Main panel, Fuse/Relay box 3
R10	ABS relay	Micro	Main panel, Fuse/Relay box 3
R11	ATF relay (only on the R560)	Micro	Main panel, Fuse/Relay box 3
R20	Worklamp suction nozzle L20	Micro	Main panel, Fuse/Relay box 3
R21	Worklamp brush right L21	Micro	Main panel, Fuse/Relay box 3
R22	Worklamp brush left L21	Micro	Main panel, Fuse/Relay box 3
R31	Worklamp front L31	Micro	Main panel, Fuse/Relay box 3
R33	Worklamp rear L33	Micro	Main panel, Fuse/Relay box 3
R30	Worklamp third brush L30	Micro	Main panel, located between nodes 22 and 23


Rdir LED
Rwip
Racc
Climate
Control
4
R8
micro
F50
F54
F51
F55
R2
micro
R7
micro
F52
F56
F53
F57

RELAY	DESCRIPTION	TYPE	POSITION
FL	Flasher with LED check	Micro	Dashboard, FR box 4
Wiper Ctrl	Wiper interval relay	Munske	Dashboard, FR box 4
Rxx	Climate control (option)	Mini	Dashboard, FR box 4
R7	Mirror heating (option)	Micro	Dashboard, FR box 4
R8	Fog lights	Micro	Dashboard, FR box 4
R2	Main-beam headlamp	Micro	Dashboard, FR box 4


4
RJ maxi
RHH1 micro
RHH2 micro
RHH3 micro
Redc1 micro

RELAY	DESCRIPTION	TYPE	POSITION
RJ	Starter relay, only for TIER 4	Maxi	Main panel, position ABS
RHH1	DEF heating relay, only for TIER 4	Micro	Main panel, position ABS
RHH2	DEF heating relay, only for TIER 4	Micro	Main panel, position ABS
RHH3	DEF heating relay, only for TIER 4	Micro	Main panel, position ABS
Redc1	Start cut-out relay, only for TIER 4	Micro	Main panel, position ABS

F. 14 Maintenance of air conditioning unit

Owners and/or managers of air conditioning systems are subject to CFC legislation. This determines the method of treatment applicable to substances that attack the ozone layer

⚠
WARNING
THE AIR CONDITIONING UNIT IS FILLED WITH R134A COOLANT. SERVICE AND MAINTENANCE OF THIS TYPE OF UNIT CAN ONLY BE CARRIED OUT BY STEK APPROVED COMPANIES. THESE COMPANIES ARE FAMILIAR WITH ALL (TECHNICAL) REQUIREMENTS APPLICABLE TO OLD OR NEW INSTALLATIONS.

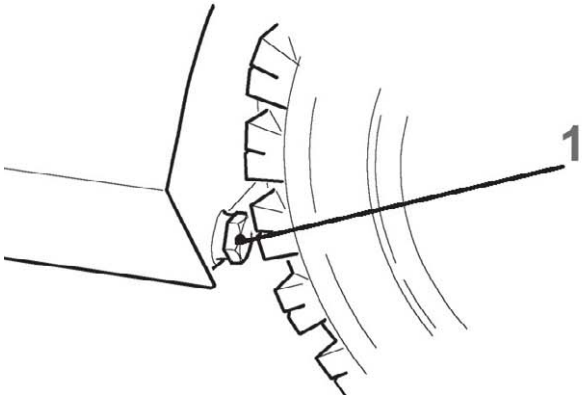
F. 14.1 Checking the drive belt

The condition and tension of the belt of the air conditioning compressor drive should be checked regularly. Replace belt if necessary.

F. 14.2 Annual inspection

The management of air conditioning units is subject to legal requirements to prevent loss of coolant. This includes regular inspections and maintenance of installations by qualified personnel. In all cases, the installations should undergo preventive maintenance at least once a year

⚠
NOTE
TO PREVENT COOLANT LEAKS (WHICH DAMAGE THE ENVIRONMENT), THE AIR CONDITIONING SYSTEM SHOULD BE OPERATED ON A REGULAR BASIS.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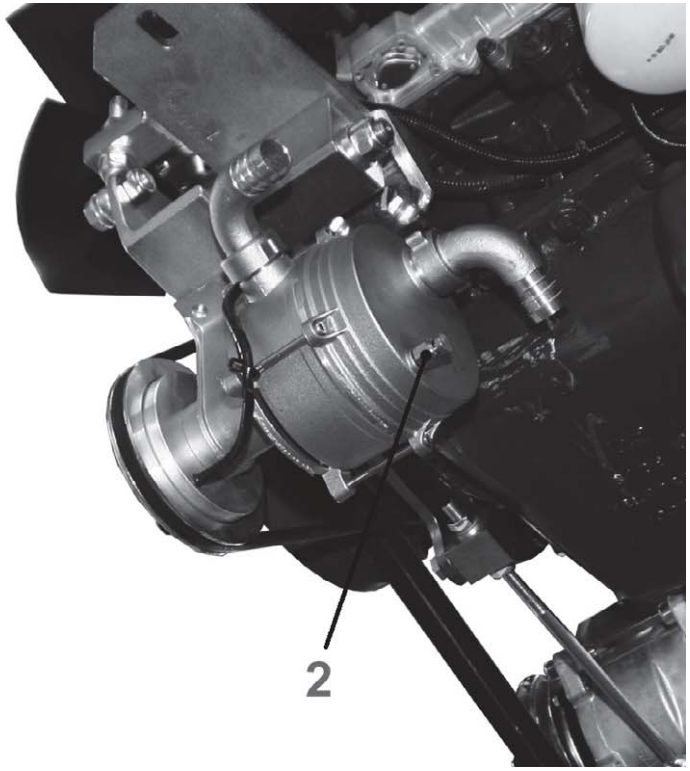
3


2

F. 15 Sub zero operation

The machine should always be parked in a frost-free environment where possible.

F. 15.1 If sub zero temperatures are expected

- Ensure that there is sufficient coolant in the cooling system. The vehicles are supplied filled with coolant. See technical specifications
- Ensure the right grade of engine oil and hydraulic fluid are used. See technical specifications
- Use winter diesel in the fuel tank.

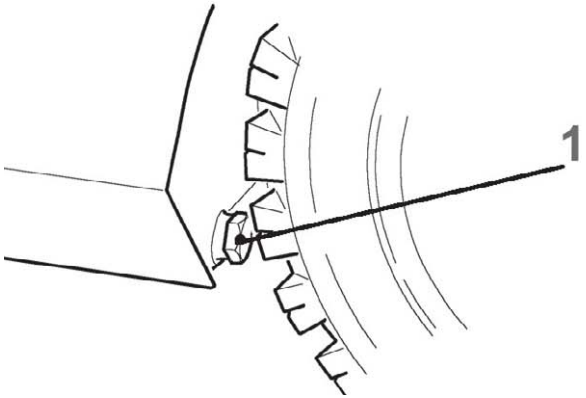
F. 15.2 Drain the spray water tank (option 1)

- Position the vehicle over a drain, or place a flat collector under the drain plug (1) near the right front wheel
- Loosen off the drain plug (1) and allow the water tank to drain fully
- Replace the drain plug (1)
- Open all brush and suction head sprayer valves
- Switch on the water spray pump using the buttons on the control panel. The pump will continue to operate until all the water has been drained
- Vent all lines and jets with compressed air.
- Drain the water from the spraywater pump using the drain point (2) on the pump.
- Drain the water in the water-spray fine-dirt filter (3).

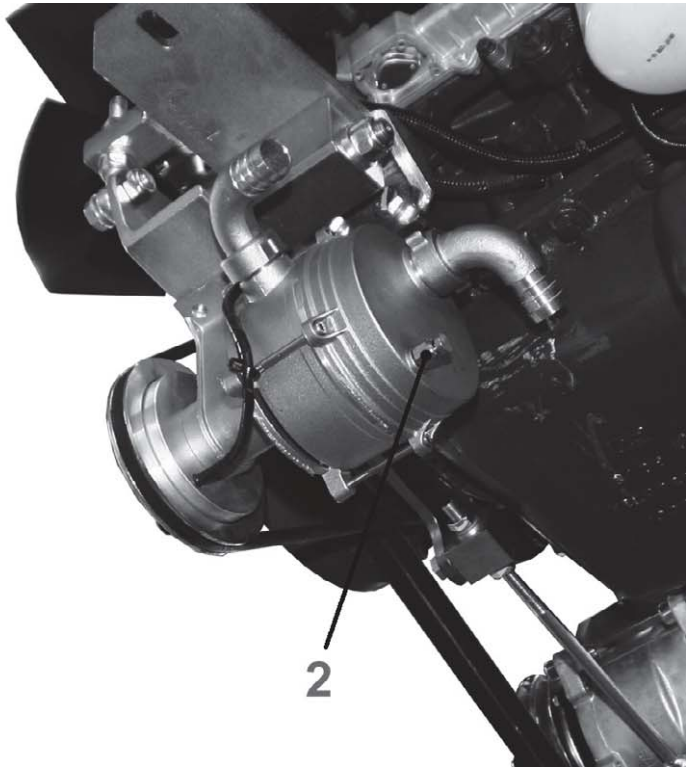
F. 15.3 Drain the spray water tank (option 2)

- Drain the water tank
- Fill the water tank with approx. 20 litres of water containing antifreeze
- Open all valves to the water jets
- Put the sweep-tip switch on the dashboard in the sweep position
- Put the brush switch on the dashboard in position 2 to activate the brush jets
- Put the water spray pump switch on the dashboard in position 2 to activate the jets in the suction head switch
- Switch off the sprayers and close all water valves.

⚠
NOTE
KEEP THE ENVIRONMENT IN MIND. COLLECT THE WATER AND ANTIFREEZE.


1

3


2

F. 15.4 What to do after a period of frost

Carry out these instructions after a period of frost if the water spray pump and the water tanks have been drained. This procedure is also applicable after the water spray pump has been replaced.

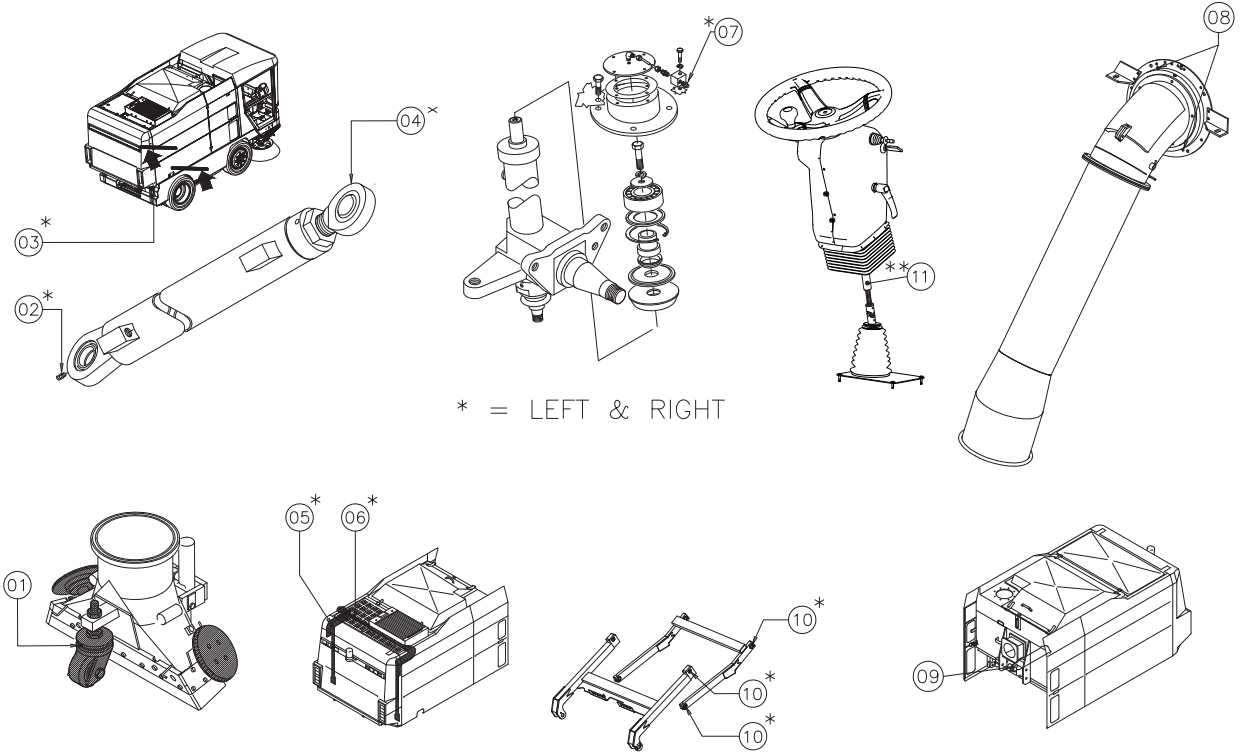
- Fill up the water tank completely.
- Open all taps to the water jets.
- Make sure the driver seat switch is activated, do this by sitting on the driver seat.
- Start the engine and set to 1500 RPM
- Set the switch empty/drive/sweep on the dashboard to sweep
- Set the switch for the brush on the dashboard to position 2 to switch on the brush jets
- Set the switch for the water spray pump on the dashboard to position 2 to switch on the jets in the suction mouth
- Lower the brushes and the suction mouth using the joystick

NOTE

IF THERE IS NOT SUFFICIENT WATER PRESSURE WITHIN 10 SECONDS THE WATER SPRAY PUMP WILL SWITCH OFF. THE LIGHT IN THE SWITCH FOR THE WATER SPRAY PUMP WILL BEGIN TO INDICATE THERE IS NO WATER PRESSURE AVAILABLE.

If the light in the switch for the water spray pump begins to flash carry out the following steps.

- Switch off the water spray pump using the switch on the dashboard. The light will stop flashing.
- Set the switch for the water spray pump on the dashboard to position 2
- Repeat the above steps until water comes out of the jets.


04
03
02
07
11
08
* = LEFT & RIGHT
01
05
06
10
10
10
09

F. 16 Lubrication frequency for manual lubrication

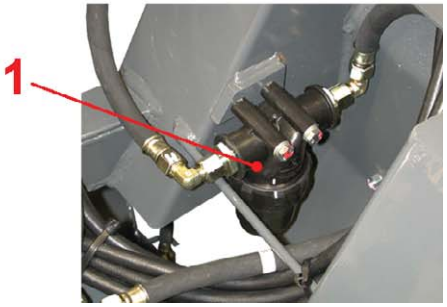
NUMBER	NAME	FREQUENCY
01	castor	Weekly
02	bottom of the tipping cylinders	Monthly
03	swivel pins of the container	Monthly
04	top of the tipping cylinders	Monthly
05	swivel pins of the locking rod	Monthly
06	swivel pins of the boomerang shaft	Monthly
07	heads of the sprung struts	Monthly
08	slew ring of the suction tube	Monthly
09	push-out cylinder of the container dump	Monthly
10	hinge points of the container dump arms	Monthly
11	Universal joint shaft of the steering mechanism	Every 3 months

* Use NLGI grade 2 grease.

** Use PTFE grease.

3
2

4


1

F. 17 Spraywater fine-dirt filter

For proper operation of the sprayers on the sweeper it is important and necessary to clean the spraywater fine-dirt filter (1) regularly.This will prevent blockages in the spraywater system.

F. 17.1 Cleaning/replacing the spraywater fine-dirt filter

⚠
NOTE:
THE FINE-DIRT FILTER (1) IS LOCATED AT POSITION (4) UNDER THE CHASSIS.

- Remove the filter housing (2) of the fine-dirt filter (1).
- Remove the filter (3).
- Check if the filter (3) is dirty.Clean or replace the filter (3).
- Fit the filter (3).
- Fit the filter housing (2) and tighten it by hand.

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